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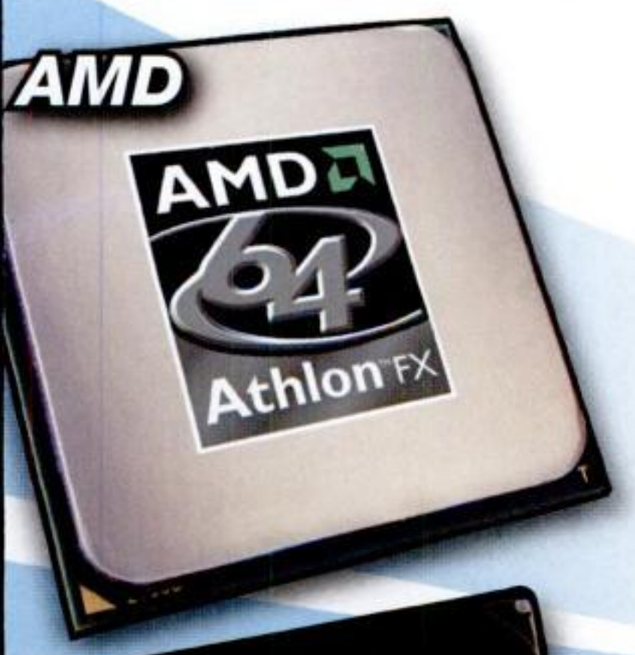

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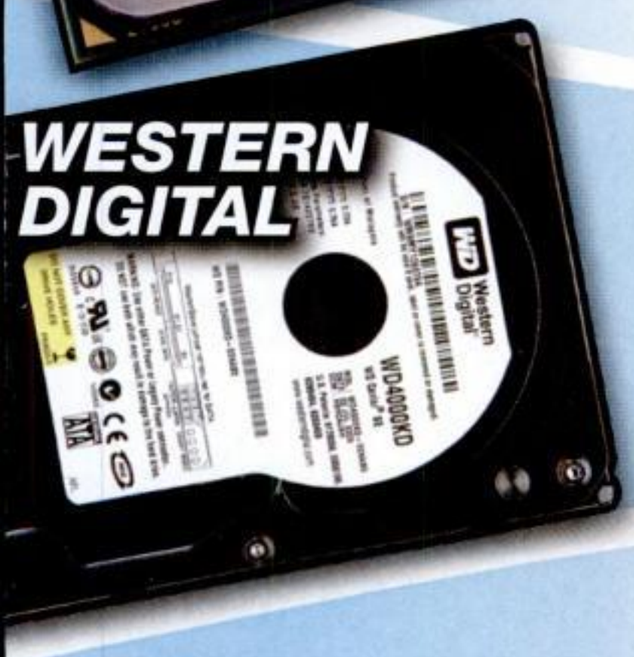

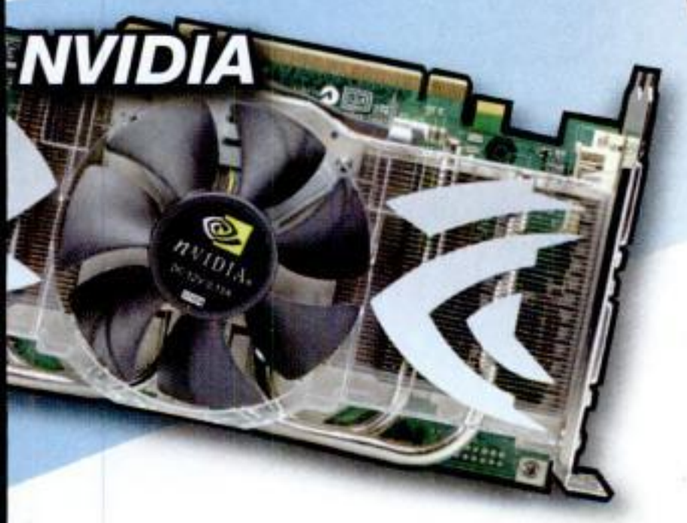

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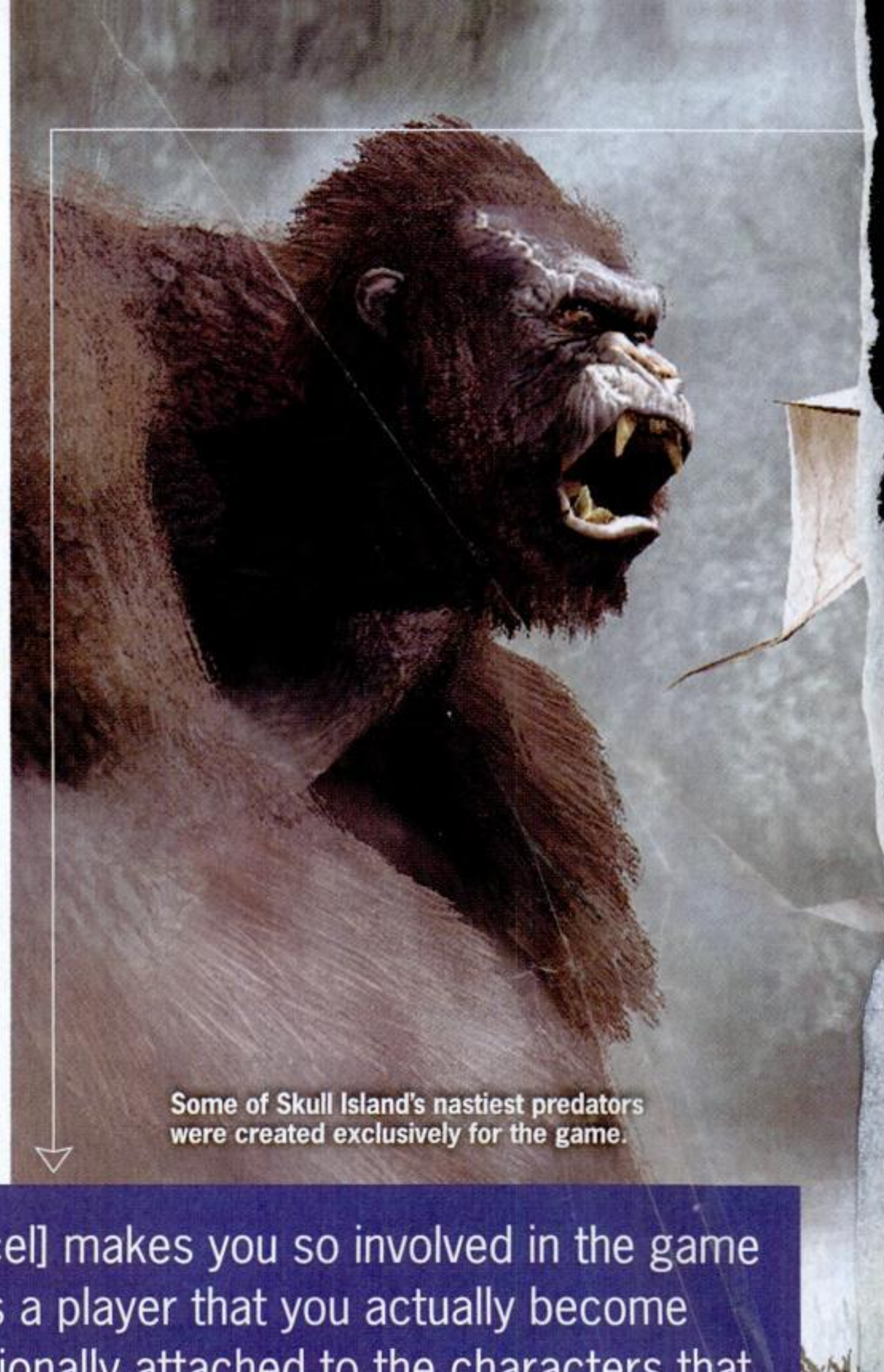
King Kong first stormed the silver screen in 1933, astonishing audiences with a powerful story and groundbreaking special effects. Peter Jackson's current re-imagining promises to do no less, bringing the perilous world of Skull Island to life as only Jackson can. Jackson – and famed game designer Michel Ancel, that is.



Some of Skull Island's nastiest predators were created exclusively for the game.

"[Ancel] makes you so involved in the game as a player that you actually become emotionally attached to the characters that you're playing with."

– Peter Jackson

+ + + + + + + +

PETER JACKSON BEGAN DREAMING UP IDEAS for a King Kong computer game as soon as he started on the movie. An avid gamer, he wanted to create a game that was both deeper and more immersive than the film, and that packed at least as much technical wow. By forming an extraordinarily close partnership with renowned game designer Michel Ancel, Jackson accomplished that and more.

BREATHING LIFE INTO A LEGEND

Jackson and Ancel set out to create a game that looks and feels as convincing as the "real" world captured on film. To achieve this, their development team used every trick in the book – plus a few that aren't.

Most remarkable, perhaps, is their use of inverse kinematics, which adds frightening realism to the behavior of Skull Island's predators. This technique varies and synchronizes the animations used for each type of creature, depending on the creature's AI. For example, if you're detected by a V-Rex, you'll see it turn its eyes and head directly toward you, lunging over rocks and smashing through the jungle in a convincing attempt to make you its dinner.

The creatures' animations are triggered by a sophisticated AI system that governs the behavior of Skull Island's many species. Some species attack alone, while others use clever pursuit tactics to attack in groups. This "food chain" effect is especially unnerving when you run the game on a multi-threaded processor like the Intel® Pentium® processor Extreme Edition. Having two processing cores with Hyper-Threading Technology lets you run four threads simultaneously, giving your PC stronger multitasking capability and making the AI that much more lifelike.

Fortunately, your enemies aren't the only intelligent creatures on Skull Island. Your fellow explorers will protect you, suggest solutions to problems, and generally react as real humans would.

A MASSIVE STEP FORWARD: INNOVATIONS IN IMMERSION

Every technical decision has been made with an eye to immersing the player in the world of the game. As you move through the jungle of Skull Island, blades of grass rustle around your legs. Sunlight patterns shift subtly; creatures stir in the distance. With a strong chipset – especially one supporting Hyper-Threading Technology[1] – the game's seemingly infinite layers of lighting

You'll need your weapons, your team, and quick reflexes to survive on Skull Island.

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filters, 2D sprites, and meteorological effects don't just make the jungle look incredible. They bring it to life.

Unlike most games, the scripted events run off the in-game engine, so you can look around and move as they unfold. The absence of a heads-up display makes the action feel more immediate. Instead of monitoring a health bar, you know that your character is weakening when your vision blurs and turns red.

The game also offers experiences that don't appear in the movie. Creatures that Jackson couldn't fit into the film fill the jungle. Multiple pathways offer you a different experience every time you play, so that you'll never have to play the same game twice. The difficulty level also scales fluidly according to your performance, growing more challenging as you improve. This multi-threaded design is optimized on a dual-core processor like the Intel® Pentium® processor Extreme Edition, offering an intensely cinematic game experience.

PLAYING WITH POWER: HEROES GREAT AND SMALL

Perhaps most impressive is the range of emotions evoked by the alternating gameplay. By inviting you to play as both Jack Driscoll and Kong, the game delivers a dramatic shift in perspective and power.

As Jack, you are constantly outnumbered and overpowered by predators that are bigger, stronger and faster than you. To heighten the sense of fear and danger, Jack's role is played in first-person. You have to advance through a dense and deadly jungle, never knowing what's behind the next tree. Armed only with the weapons you can carry, you'll never win just by fighting. You'll need other strategies to stay alive, such as tricking predators into battling each other and using the environment to set traps.

Kong's third-person play becomes available at key moments. When the camera pulls back to reveal Kong's mighty perspective, you feel a rush of freedom and power. Delivered from the harried perspective of Jack, you inherit swift movements, powerful battle attacks, and the gratifying ability to smash, throw and scale the objects around you. But playing Kong isn't just a walk in the park. Confronted by multiple enemies with varied attack patterns, you'll have to fight hard to defeat huge V-Rexes and outsmart swarms of smaller predators.

The alternating gameplay between Jack and Kong not only intensifies the emotions inherent in the story, it also presents you with new challenges just when you want them most. Played on a top-notch system based on the Intel Pentium processor Extreme Edition, the stunningly detailed graphics, ultra-realistic game physics and advanced artificial intelligence provide a superior game experience that is nothing short of unforgettable. ■

Where guns fail, brute strength often prevails.

PETER JACKSON'S
KING KONG
THE OFFICIAL GAME OF THE MOVIE

TEEN T CONTENT RATED BY ESRB — Blood Violence

PC CD-ROM SOFTWARE

Runs great on intel inside pentium EXTREME EDITION

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[1]Hyper-Threading Technology requires a computer system with an Intel® Pentium® Processor Extreme Edition supporting Hyper-Threading Technology and a Hyper-Threading Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/info/hyperthreading/.

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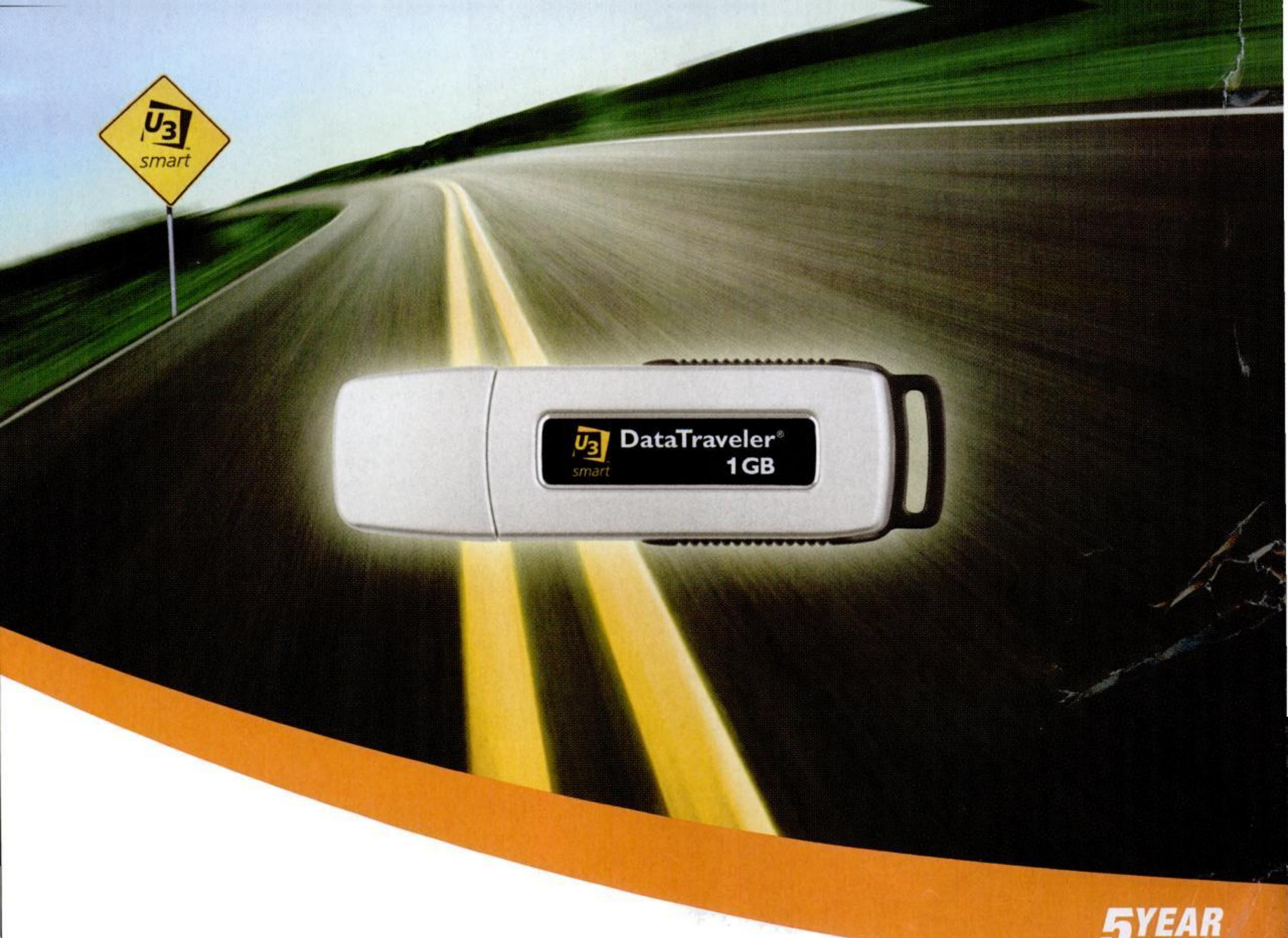

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Ed Word

The REAL Reason DRM Sucks

As my wife, friends, and coworkers can attest, I really don't like digital-rights management technology. I've railed against the choreographed erosion of Fair Use rights for years. While I definitely think people should be paid for the music they produce, I detest DRM in its current form. It just doesn't make sense.

Current DRM tech, whether it's the iTunes Music Store's Fairplay, protected WMA files, or copy-protected "CDs," is broken. These DRM schemes don't do anything to prevent determined individuals from copying a CD or ripping it. It's easy to decrypt these files with downloadable tools that are just a Google search away. Once decrypted, one person can distribute the songs over the Internet to everyone in the world. So what we have are DRM schemes that prevent normal people from exercising their Fair Use right to buy an album once and listen to it in their car, through a streaming box, and on an MP3 player, but which don't actually do anything to stop the larger problem of music piracy. I don't know about you, but I think that's bunk.

So why have hardware manufacturers gotten in bed with the nasty music industry creeps? It's simple! By forcing your customers to use your proprietary DRM scheme, you also lock them into using your hardware. The iTunes Music Store is a perfect example. If you spend a ton of money at the iTMS, there's no way you're going to throw out all that music and switch to a Windows Media-compatible player that can't play those songs. Sure, you could burn all the songs to CD, and re-rip them in an unprotected format; but you lose sound quality when you do that. And it's a huge pain in the ass.

It really doesn't make sense to spend money on downloadable music when you get tracks encumbered by crippling DRM and lossy compression for the same price as an old-fashioned CD.

Of course, schemes to copy-protect CDs have been around for a while, and they're getting worse. Now that the mainstream media has taken note, and Sony has recalled a ton of afflicted CDs, you might think we've won the fight against DRM. The fight's not over yet. Not by a long shot.

So, if you buy a CD encumbered with DRM, don't take it sitting down. Take the disc back to the place of purchase, tell the store it's defective, and demand your money back. When they ask you what's wrong with the disc, the answer is simple. Tell them it won't work with your iPod.

The music industry may not listen to us, but it'll sure as hell listen to Best Buy.

Will Smith

Please send feedback and lemon tarts to ***will@maximumpc.com.***

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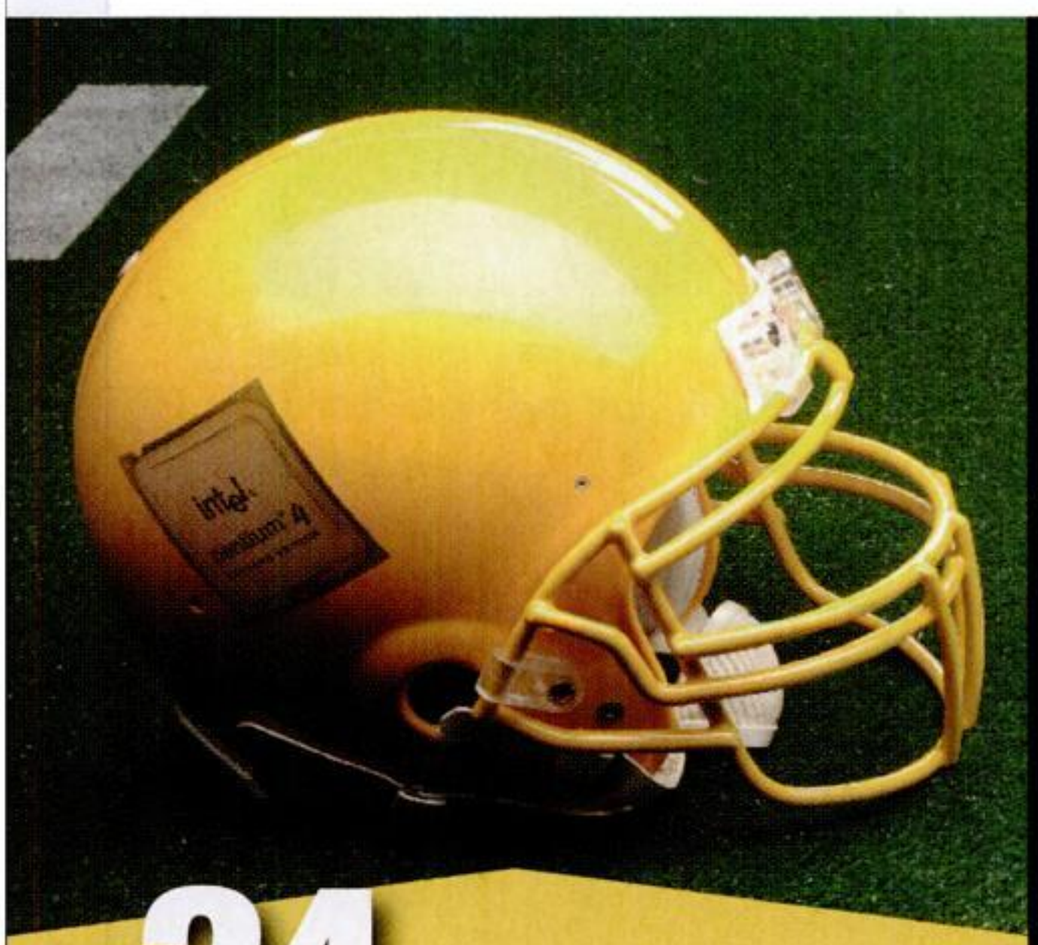

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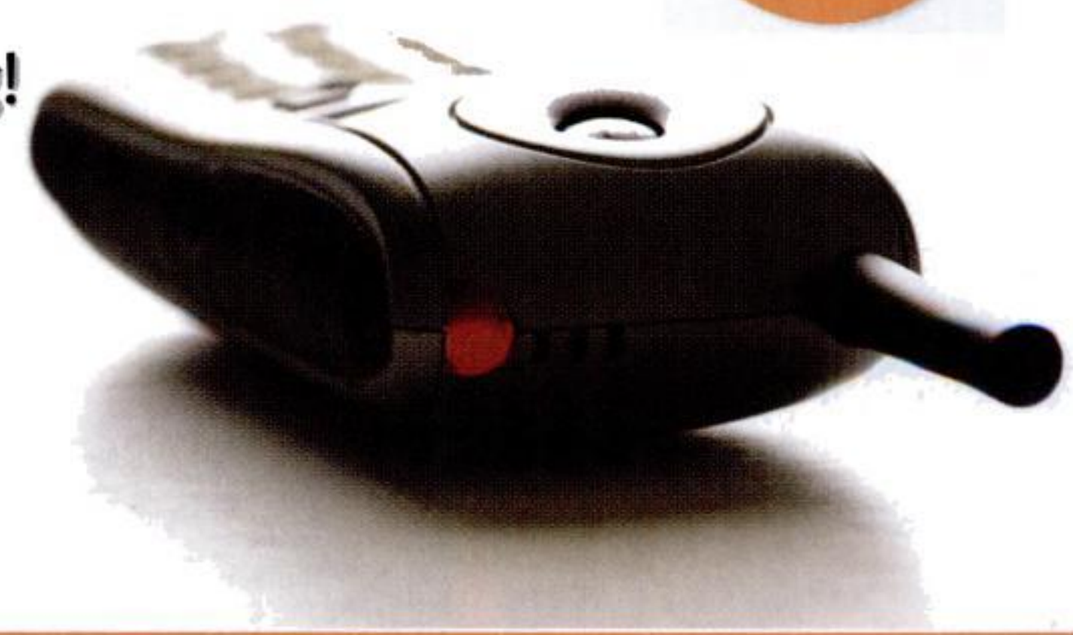

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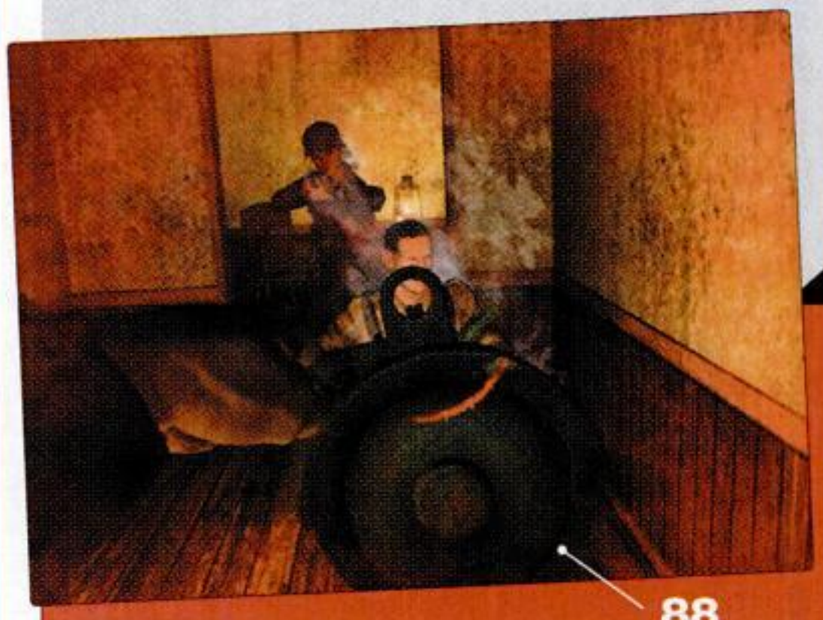

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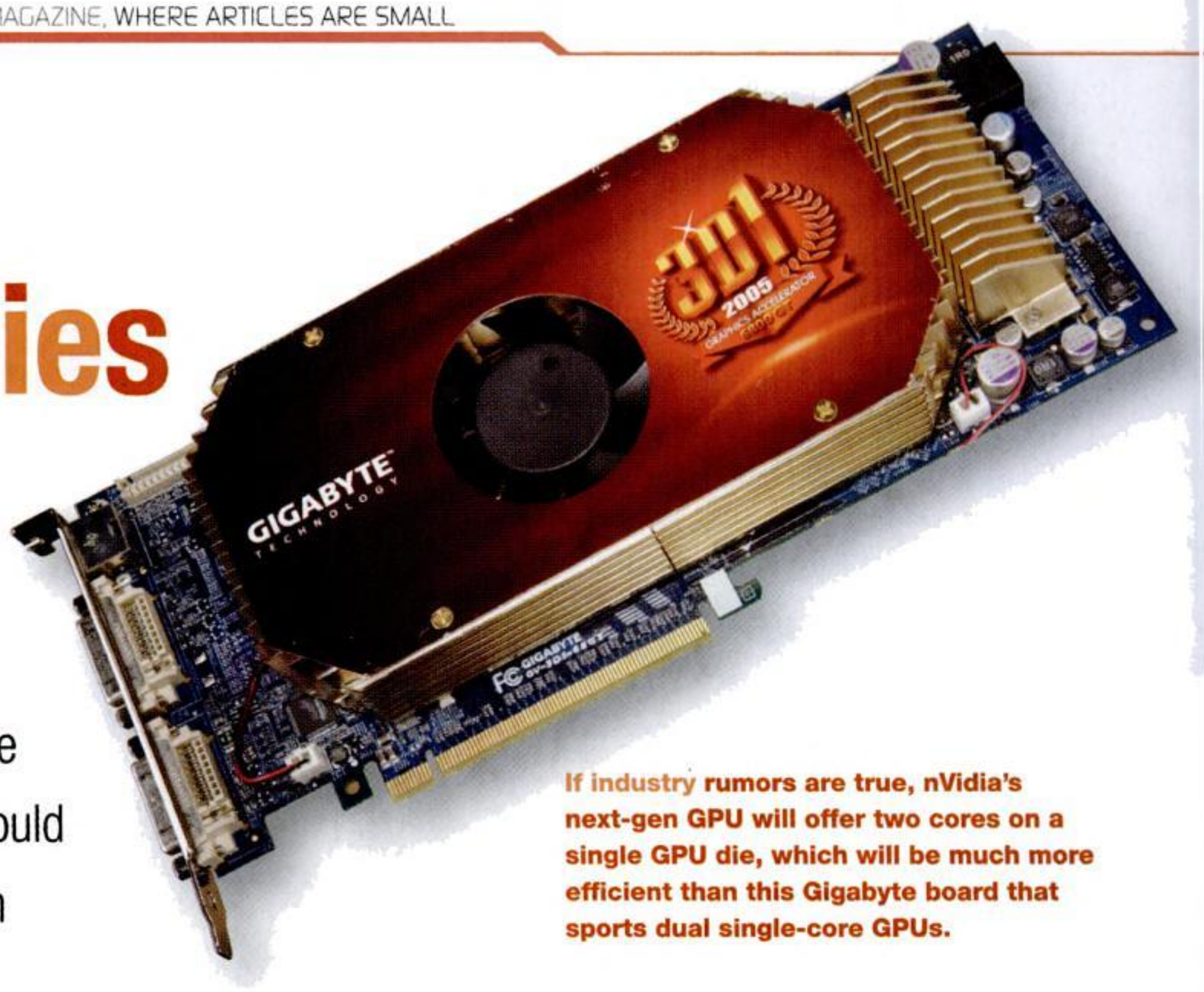
The Top Technologies of 2006!

We cast our steely gaze over the technology landscape, with an eye on three new technologies that could revolutionize the PC experience in 2006, and beyond!



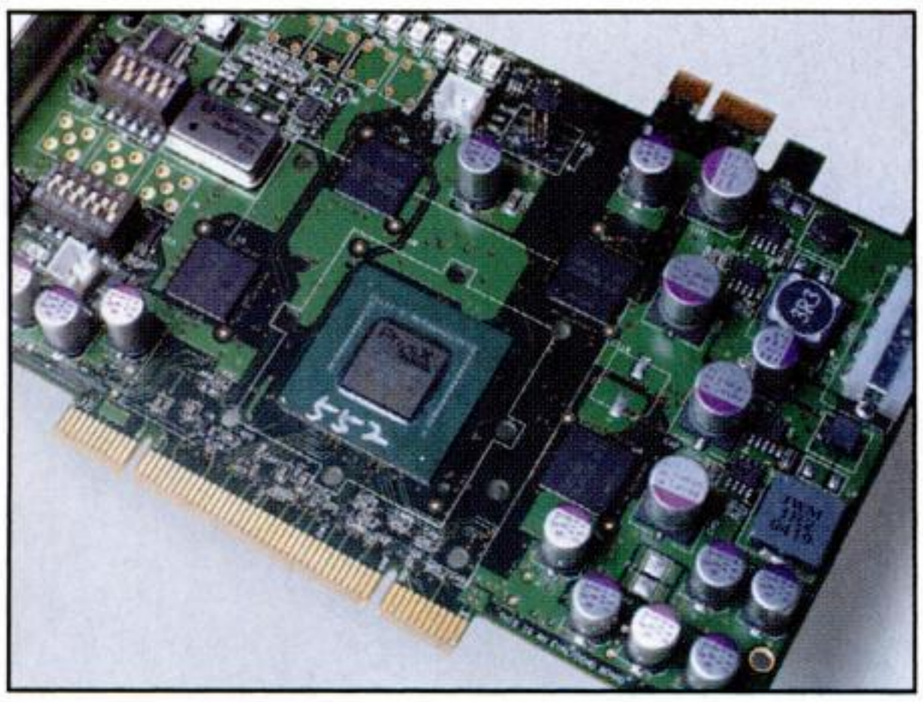
If industry rumors are true, nVidia's next-gen GPU will offer two cores on a single GPU die, which will be much more efficient than this Gigabyte board that sports dual single-core GPUs.

DUAL-CORE GPUS

Though we have no official confirmation from either ATI or nVidia, we'll go on record saying that both companies will release dual-core GPUs in 2006. The reason is simple: Just as in the CPU world, the quest for ever-higher clock speeds in videocards has led to massive cooling solutions that consumers have roundly rejected in favor of quieter, single-slot coolers. And just as the CPU makers have declared a cease-fire of sorts and adopted multicore as their long-term strategy, we anticipate the videocard manufacturers adopting a similar strategy. In fact, dual-core GPU designs will probably see more dramatic performance gains than dual-core CPU designs, simply because graphics can benefit from increased parallelism without requiring any tweaks to applications.

Of course, dual-GPU videocards are already available on the market from enterprising manufacturers such as Gigabyte and Asus. These boards have shown near-SLI benchmark scores, but they have to accommodate two large, hot single-core GPUs on a single board. By switching to a dual-core design, manufacturers could reap performance dividends without running into heat problems.

ATI has even hinted to *Maximum PC* that it might be interested in producing its own dual-GPU solution, with one GPU dedicated solely to calculating physics, which brings us to our next bit of technology intrigue.



2006 could be remembered as either the year of the PhysX processor (above), or as the year Ageia went out of business.

PHYSICS ACCELERATORS

We've covered the up-and-coming Ageia PhysX accelerator before, and all signs point to its actual arrival sometime in 2006. The upstart technology company's add-in board has gained momentum recently with industry heavyweights Asus and BFG onboard to produce boards for retail sale.

While it's true that no games have yet arrived that take advantage of the PhysX processor, Ageia has signed up a truckload of developers to use its tech in their games. Such industry luminaries as Ubisoft and Epic Games are already on board; in fact, the PhysX processor will accelerate every game that's powered by the Unreal 3 engine. Watch this space for more info.

NEW SOCKETS AND MEMORY FOR EVERYONE!

We've already reported on the new "Socket M2" from AMD that will replace the aging Socket 939 interface, but additional details have come to light. Now known as "Socket F" AMD's new tech bears a remarkable resemblance to Intel's LGA775 architecture, with the pins on the CPU socket rather than the underbelly of the CPU. This is according to leaked "spy shots" of the socket, which may or may not be legit. The new socket will use DDR2 memory running at 667MHz and is scheduled for release in April of 2006.

And just as AMD climbs aboard the DDR2 train, rumors abound that Intel will switch to DDR3 memory at the same time or shortly thereafter in order to keep one step ahead of its nemesis. Industry insiders quip that Intel has already begun testing DDR3 modules on an unnamed, unannounced desktop platform, and that like DDR2's unimpressive rollout, the new memory chips may also be underwhelming at launch, given their conservative timings.

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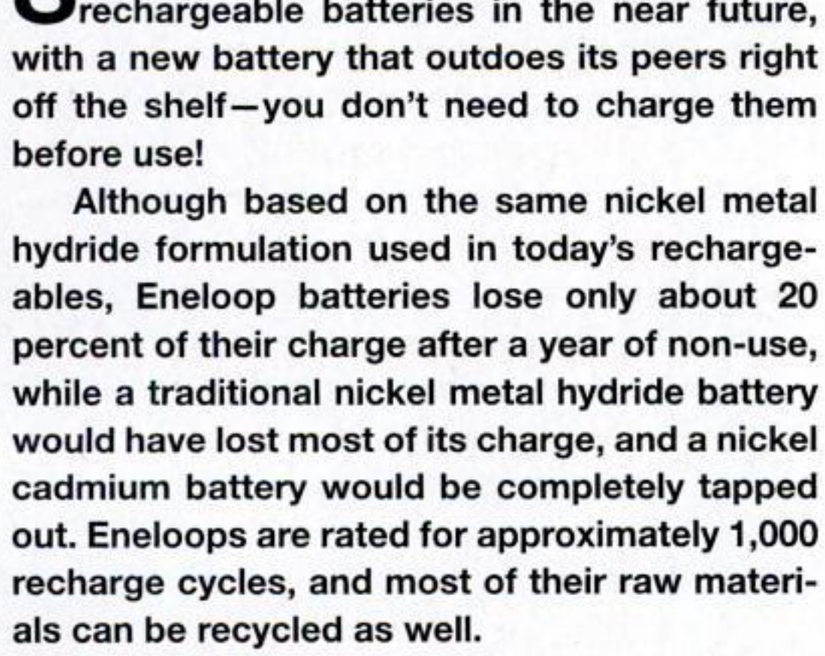
The Scoop on Eneloop

Save the world with Sanyo's new rechargeables

Sanyo aims to change our dim impression of rechargeable batteries in the near future, with a new battery that outdoes its peers right off the shelf—you don't need to charge them before use!

Although based on the same nickel metal hydride formulation used in today's rechargeables, Eneloop batteries lose only about 20 percent of their charge after a year of non-use, while a traditional nickel metal hydride battery would have lost most of its charge, and a nickel cadmium battery would be completely tapped out. Eneloops are rated for approximately 1,000 recharge cycles, and most of their raw materials can be recycled as well.

Eneloop batteries are already available in Japan, and should reach the U.S. in early 2006, at a cost of approximately $10 for two AA batteries.



Free with Every Sony CD: Malware!

1. Sony distributes hundreds of CDs, by various artists, with digital-rights management applied to the disc, to the horror of musicians and fans alike.

2. The DRM installs a "rootkit" (a tool that installs itself in such a way that it's hidden from the OS) on Windows PCs. The rootkit makes any file prefixed with sys completely invisible to your system—something hackers can easily exploit.

3. Thomas Hesse, president of Sony BMG's Global Digital Business, responds to the furor with unassailable logic: "Most people, I think, don't even know what a rootkit is, so why should they care about it?"

4. Mark Russinovich publishes evidence that Sony's DRM notifies the company each time the protected CD is played (www.sysinternals.com/blog/).

5. Sony releases a patch that does not remove the rootkit, only the cloaking component.

6. Facing mounting criticism and word that hackers were exploiting its rootkit software, Sony suspends use of the software until further notice, and recalls affected discs.

When You Care Enough to Send the Very Best

We recently received an unusually large package from China in the form of a wooden palette. On top of the palette were four boxes—three of which contained nothing more than air. When we opened the fourth box, we found... a single hard drive. Thanks, (manufacturer's name redacted)!

FAST FORWARD

TOM **HALFHILL**

Wireless Power

Thanks to technologies like Wi-Fi, Bluetooth, and cellular telephony, more networks and consumer electronics are going wireless. It's great to be liberated from cumbersome wires and cables, enjoying the freedom to communicate from almost anywhere. Wouldn't it be even better if our wireless gizmos could be powered wirelessly?

Think of it: no more power cords, wall warts, batteries, or chargers. It's an age-old dream. Electronics pioneer Nikola Tesla experimented with wireless power transmission in the 1800s. Today, RFID chips power themselves using energy beamed from their wireless readers. I have a science-fiction novel from the 1930s that envisions airliners in 1980 powered by "wireless ray."

Unfortunately, 1980 has come and gone without wireless electric airplanes. The problem with wireless power transmission is that beaming that much energy through the air would cook anything in its path. So researchers are working on another approach that also intrigued Tesla: ambient power generation. The idea is to generate power where it's needed by exploiting environmental energy sources.

Solar cells are the best-known example of this technology. The most interesting research, however, taps other ambient energy sources, such as background vibrations, temperature changes, and human motion. The blanket term for this technology is "energy harvesting" or "parasitic power."

For instance, a company called EnOcean makes self-powered wireless network nodes for industrial applications. One clever device is a wireless light switch. Flipping the switch uses your finger's kinetic energy to generate a tiny surge of electricity—just enough to power a tiny radio that transmits an on-or-off signal to the light bulb. The bulb still needs line power, but the switches are wireless and can be located anywhere and moved anytime.

Other power harvesters generate electricity by absorbing vibrations from factory equipment, vehicles, or ships, or by leveraging temperature changes in the air or water. The University of Pennsylvania invented a backpack that generates a surprising amount of power from the wearer's normal gait. Others are working on power-generating shoes and solar-cell clothing.

Power harvesting won't keep your hungry notebook computer running without batteries any time soon. But smaller devices like MP3 players, wireless headsets, remote sensors, and even cellphones could be powered this way—and it's not science fiction any more.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

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LoJack for Your Laptop

When Tony Serrano left his HP laptop sitting in his car outside his Miami home, for "just a minute," he became one of the 600,000 people who had their laptops stolen last year. But unlike most people, Serrano had AbsoluteSoftware's *LoJack* software installed on his Pavilion notebook. Serrano called the police and AbsoluteSoftware to report the theft, but he didn't hold out much hope. "I thought they would never find it," Serrano told *Maximum PC*. When the thief plugged the stolen computer into a network, however, the *LoJack* software began secretly broadcasting its IP address. Within two days, police recovered the notebook just as a university student was in the process of reformatting it and loading Windows XP.

Even if the student had blown away the OS, *LoJack* would have delivered the goods, said Ben Haidri, an executive with the company. *LoJack* resides in a hidden portion of the hard drive that isn't erased by an OS install or normal format, Haidri said. And newer notebooks even support *LoJack* loading directly into the BIOS.

***LoJack* is sophisticated enough to wait until there's no keyboard activity, at which time it turns on the modem and dials an 800 number that instantly tells AbsoluteSoftware its identity. Once the notebook has pinged AbsoluteSoftware, a recovery team contacts local police and walks them through the process of contacting the ISP to find out the location of the stolen laptop.**

Future versions of the program will even let the consumer secretly download valuable documents off a stolen computer or delete sensitive information on command. *LoJack* costs $50 for one year, $100 for three years.
www.lojackforlaptops.com

Firefox Coming on Strong

The latest numbers show Mozilla's *Firefox* browser steadily gaining on Microsoft's ubiquitous *Internet Explorer* web browser, but it's still a long, long way from achieving parity. As of October 2005, reports show *Firefox* with 8.65 percent worldwide market share, which is significant. At least it is until you realize *IE* has more than 85 percent of the market.

Introducing Microsoft Defender

Microsoft's still-in-beta *AntiSpyware* app will reportedly be significantly revamped—and renamed *MS Defender*—before it's integrated with the upcoming Vista operating system. Microsoft is beefing up its free malware-detection utility to detect Trojans, rootkits, and keyloggers in addition to run-of-the-mill spyware. Although *Microsoft Defender* will be included with Windows Vista, you'll still be able to disable it and run a third-party anti-malware app of your choice.

Plextor Drops the 18x Bomb!

Shattering a long-held industry belief that 16x is the fastest speed a burner can write to recordable DVD media, Plextor has announced its all-new PX-760A 18x double-layer burner. Like other highly touted Plextor burners, the PX-760A can achieve top speed on even slower-rated 16x media. The drive will also burn double-layer +R media at 10x and double-layer –R media at 6x. Yummy.

GAME THEORY

THOMAS **MCDONALD**

Death in the Rabbit Warrens

FEAR is a perfect example of diminishing returns. The latest shooter from Monolith begins like gangbusters, offering a heady fusion of Japanese-style horror and straight-up American run-n-gun gameplay. The opening is so strong, and the atmosphere so creepy, that it carries the game a fair distance before you notice its problems.

Unlike *Doom 3*, which reached the bottom of its hackneyed bag o' tricks after about an hour of gameplay, *FEAR* holds you much longer. The designers play their cards effectively. You're hit with a barrage of twisted imagery, zapped into alternate visions, and given passing glimpses of nightmarish things, most notably the creepy-little-girl-with-long-dark-hair-in-her-face (a staple image in Japanese horror, most notably *Ringu*/*The Ring*).

Then they back off. The visions and glimpses spread out a little further, supplanted by remarkably effective and eerie sound design. By this point, the game has done its work on you, leaving you in a state of tense expectation as you wait to see what's around the next corner. This is a tough thing to do in a movie. To sustain it in a game as long as Monolith does is quite a feat.

But as with so many Monolith games (such as *Blood* or *Nobody Lives Forever*), the whole thing eventually runs aground on the sandbar of bad level design. Although Monolith clearly takes a few pages from the Valve playbook in an attempt to create a vivid game world with an integral narrative, the developer failed to learn a similarly important lesson about creating believable environments. *FEAR* is remarkably linear for a shooter, funneling you through an endless sequence of convoluted, maze-like locations. It's like being stuck in a rabbit warren. If an architect created plans for an office/factory/lab with layouts like these, he'd be locked up.

The awkward layout design might be intended to create plenty of blind corners and hiding spots for enemies, but it only succeeds in making the levels feel choppy and unappealing. Even with so many twists and turns, enemy encounters soon fall into a fairly rigid and predictable pattern of small squad encounters. Lumping the bad guys in one place and giving them a decent tactical AI works for a while, but eventually becomes predictable and then tedious. *FEAR* has plenty of atmosphere and eerie moments, but a shooter stands or falls on level design, something Monolith has never done consistently well.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

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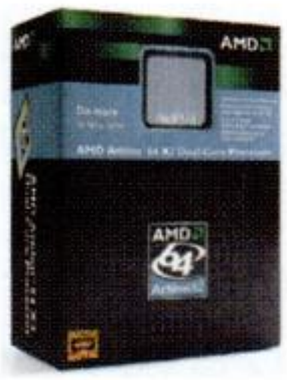
FUNSIZENEWS

DELL STARTS SELLING AMD CPUS

We all knew it was just a matter of time before Dell would cave and begin selling AMD processors. The time, it seems, has finally come. Dell still isn't offering AMD-based desktops, but rather individual processors for sale instead. At press time the Dell online store was offering six AMD processors for sale, ranging from an Athlon 64 3500+ to a dual-core X2 4400 for retail sale. The reason? "Customer demand," according to a Dell spokesman.



AMD TRUMPS INTEL... AGAIN!

When AMD beat Intel at retail desktop and notebook sales in August, industry insiders claimed it was a fluke, but AMD repeated the feat once again in October, besting Intel by 1.3 percent according to a report from Current Analysis. AMD CPUs accounted for 49.8 percent of all PCs sold at retail, whereby Intel chips accounted for 48.5 percent. This allowed AMD to increase its U.S. retail percentage from 52 percent in September to a whopping 67.7 percent.

ATI TAKES A TUMBLE

ATI's recent blunders have caused the company to lose market share to nVidia. Research from John Peddie shows that in Q3 ATI's shipments increased by a mere 7.6 percent while nVidia ramped up shipments 28.3 percent. The resulting conflagration diminished ATI's market-share lead over nVidia to a measly 1.3 percent. On the "discrete desktop" side of things, nVidia saw shipments increase three-fold last quarter, no doubt thanks to its stellar 7800 series of graphics cards.

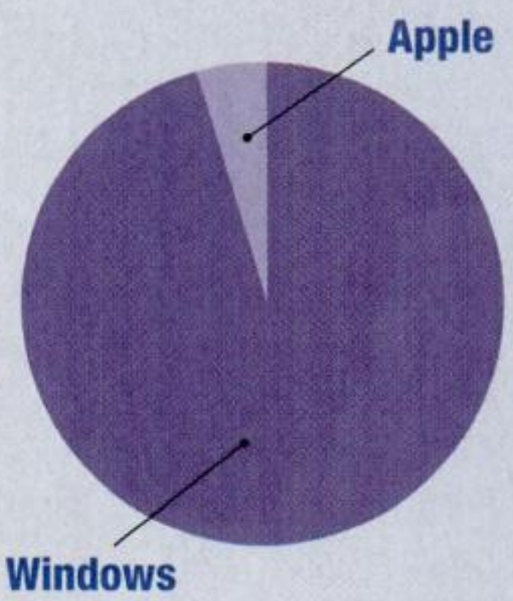
USE BIT TORRENT, GO TO JAIL

A file-sharer in Hong Kong was sentenced to three months in jail recently—one month for each movie he was sharing over the highly popular Bit Torrent P2P network.

The illegally obtained—and shared—movies were discovered during a so-called "customs raid" on the man's house by Chinese officials. Sadly, the man will likely be treated harshly in jail. The movies he was sharing—*Daredevil*, *Red Planet*, and *Miss Congeniality*—will certainly earn him an unflattering jailhouse moniker such as "lame movie guy" or "rom-com weenie."

One Million New Apple Users?

Needham & Co. analyst Charles Wolf just released a report indicating that more than a million PC users have switched from Windows to the Mac in 2005. Heck, even Maximum PC wrote an article titled "Making the Mac Switch" last month. People are reportedly won over by the Mac's association with their beloved iPods, and freedom from the onslaught of viruses and malware that have ravaged PCs this year.



Microsoft Sounds the Alarm

In a memo to top execs, Bill Gates warns of 'disruptive' changes in the world of PC software—namely, Google and other competitors on the web

According to a report in the *Wall Street Journal*, Microsoft honcho Bill Gates has sent a rousing memo to top executives at Microsoft. The memo details a "sea change" taking place in the technology industry, a change that doesn't bode well for the software giant unless it gets off its ass (our words, not Bill's). "This coming 'services wave' will be very disruptive," said Gates, describing the emergence of online services that could threaten Microsoft's core cash cow—*Office*. "We have competitors who will seize on these approaches and challenge us," said Gates.

These web services use a new technology dubbed AJAX (short for asynchronous Java and XML). The upshot is that websites written using AJAX techniques behave more like applications that run on your PC than websites. Portions of the page can refresh without requiring a reload of the entire page, and they'll work on any OS as long as you have a supported web browser (*IE4* and higher, *Firefox*, and *Mozilla* are all supported). Gmail, Flickr, and *Exchange* servers that you log into using Outlook Web Access all use AJAX.

IBM Slows Light, Paving the Way for Optical CPUs

Researchers at IBM have developed technology than can slow down light using inexpensive materials, making it possible for photons to replace electrons in CPU designs in the distant future. Using light instead of electricity inside silicon-based circuits dramatically reduces the amount of heat generated by current CPU technology, avoids the problems with quantum interference and electron migration that CPU designers are beginning to encounter, and reduces the amount of energy required to power the CPU.

The chip is called a silicon waveguide, and resembles a chunk of PCB with holes scattered all over it, which allow light to pass through in an organized fashion. The IBM chip slows light from its standard speed of 186,000 miles per second to just 1/300th of that speed.

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SURROUND SOUND:

Speakers **vs.** Headphones

High-end headphones are a blast. Pouring high-quality audio directly into your aural canal is as addicting to an audiophile as mainlining black-tar heroin is to a junkie. But the intimate proximity of headphone speakers to your ears makes it difficult for them to present a true stereo image—the center of the soundstage ends up inside your head, instead of in front of your face.

So if headphones have a hard time producing stereo, it must be downright impossible for them to create surround sound. You need a speaker system with at least six discrete channels to deliver multichannel performance, right? Well, if you present talented audio engineers with a challenging problem and a healthy R&D budget, they'll eventually come up with a solution. And the engineers at Sony, Pioneer, and other companies have come up with headphones they claim *can* deliver true surround sound.

Skeptics that we are, we had to put these claims to the acid test. We pitted the best surround-sound headphones we could find—Sony's MDR-DS8000 Digital Surround Headphone System—against Logitech's top-of-the-line Z-5500 Digital speaker system.

BY MICHAEL **BROWN**

round 1 PRICE/PERFORMANCE RATIO

At the risk of putting the cart before the horse, we'll tackle this issue first because it will help us explain our testing methodology. We used a Sound Blaster X-Fi and a collection of DVD-Audio discs, DVD movies, and games to evaluate these products. But because neither games nor DVD-Audio can deliver surround sound through the X-Fi's digital-audio output, and Sony's $800 headphone system doesn't have analog surround-sound inputs, we had to add Creative Labs' $100 DTS-610 Home Theater Connect to the mix so we could encode the analog signal before sending it to the headphones. Logitech's $400 Z-5500 speakers, of course, have both digital and six-channel analog inputs. The Logitech and the Sony devices are both equipped with DTS and Dolby Digital decoders.

WINNER: SPEAKERS

SURROUND-SOUND SPEAKERS:
Logitech Z-5500 Digital, $400, www.logitech.com

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round 2 MOVIES

We chose Alan Parker's 1982 trip-flick *Pink Floyd: The Wall* for our movie test. We used the 25th Anniversary Edition, which features a remastered 5.1-channel soundtrack. The film sounded absolutely glorious through Sony's wireless headphones, thanks to excellent drivers inside the earcups. The Z-5500 did a commendable job, but it was no match for the Sony's ability to absolutely immerse you in the music. Sony's engineers overcame two major drawbacks to headphones. First, they placed a gyroscope inside the headset that tracks your head movements, so audio events always occur in the proper location even if your head is turned. Second, they designed the infrared transmitter inside the MDR-DS8000 to support an unlimited number of the specialized headphones ($230, Sony model MDR-IF8000), so you can share the sonic glory with friends and loved ones.

WINNER: HEADPHONES

round 3 GAMES

Headphones are a major convenience with games, but even the mighty MDR-DS8000 struggled to keep up with the onslaught of audio in games like *Battlefield 2* and *FEAR*. The problem wasn't with frequency response: The headphones delivered lush sound across the entire spectrum. But when it came to positioning rapid-fire audio events such as ricocheting bullets, crashing windows, and exploding ordnance, headphones clamped over our ears were simply no match for the Logitech's discretely placed speakers. The Sony's do offer one significant advantage over speakers: They're guaranteed to not disturb anyone else in the house or in the apartment next door; provided of course, you don't scream like a little girl when an enemy unexpectedly takes you down.

WINNER: SPEAKERS

round 4 MUSIC

Sony's MDR-DS8000 proves the point that money can overcome almost any obstacle. These pricey headphones present a stunningly accurate surround-sound environment when paired with a DVD-Audio disc. (We tested them with Blue Man Group's *The Complex* and Frank Zappa's *Quaudiophiliac*.) The head-tracking feature in the MDR-DS8000 is even more important when listening to surround-sound music, because there's no video to keep your head oriented in a fixed position. Sony's accomplishment is rendered even more impressive by the fact that these headphones are wireless. The Z-5500s sound great with DVD-Audio discs, too, but they don't leave you with that same eerie impression that you're sitting onstage amongst the musicians.

WINNER: HEADPHONES

SURROUND-SOUND HEADPHONES:
Sony MDR-DS8000, $800, www.sony.com

And the Winner Is...

It should come as no surprise that surround-sound speakers are capable of delivering a tremendous surround-sound experience. The fact that they can pull off the trick at a price point as low as Logitech's Z-5500s is icing on the cake (although you can spend much less if you're willing to sacrifice audio quality, the sky's the limit if you crave something even better).

The fact that headphones of *any* stripe would be capable of pulling off this trick, however, is a whole other matter. Sony's MDR-DS8000 system does it with flair: They're ultra-comfortable, they're wireless, they're outfitted with a head-tracking gyroscope, the transmitter supports an unlimited number of additional headsets, and—most important of all—they're endowed with an almost magical ability to deliver surround sound with movies and music.

As tempted as we are to call this competition a tie, the fact that many speaker systems can deliver surround sound, and Sony's MDR-DS8000 is the only headphone system we've heard that can do it this effectively—coupled with the fact that they don't have six-channel analog inputs—leaves us with little choice but to give surround-sound speakers the win. MPC

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Dell recommends Windows®
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XPS 600 desktop and XPS M170 notebook shown.

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Our consumer advocate investigates...

✓WinFixer ✓WinAntiVirus Pro
✓EZInkjets.com ✓Atom Chip ✓Nikon

Toby, Watchdog of the month

IS THE FIX IN WINFIXER?

*Can you find out what the deal is with **WinFixer**? It's a program that somehow got onto my machine. I am very cautious and can't figure out how it happened. This program starts with pop-ups and ends with trying to install software onto your machine, automatically! Once it's on your computer, the app claims you have "errors" and that **WinFixer** can repair them for $39.95. It took me two hours to get rid of this crap. This software is distributed by a company called Winsoftware; can you tell me what the scoop is with them?*

— Greg Lambert

***WinFixer* won't fix anything on your computer until you pay for it.**

Winsoftware's *WinFixer* has been labeled as adware by anti-spyware company Computer Associates: "*WinFixer* was installed through social engineering techniques upon visiting www.600pics.com—using confusing ads and uncloseable messages." Anti-spyware company CounterSpy had this to say about the program: "Typically part of a bundle attack, W*inFixer* is a disabled data repair utility that nags the user to purchase. The program will scan the computer and report errors. *WinFixer* will report to the user that there are repairable errors but does not provide any details of what is at risk. It then recommends repairs that require a purchase to unlock the program. It also sets a registry key to automatically launch the program on startup. Since the program is disabled, this essentially nags the user to purchase the program."

The Dog downloaded and installed *WinFixer* onto a clean install of Windows XP Pro running under *Virtual PC 2005*. With nothing but *AVG AntiVirus* installed, *WinFixer* proceeded to identify hundreds of registry and file problems that reportedly could not be fixed without purchasing the application. Several of the "problem" files were .WAV files included with XP. When the Dog replaced one of the "bad" files with a known good file from another machine, and reran the scan, *WinFixer* continued to identify the file as bad. Fortunately, the iteration of *WinFixer* available at Winfixer.com is easy to remove using Add/Remove Programs. In *WinFixer's* defense, the Dog's installation of the app did not exhibit any signs of pop-up or pop-under ads. And from what the Dog can tell, *WinFixer 2005* doesn't install without your permission, but some websites push the application because they're paid according to the number of installations, according to CounterSpy.

***WinFixer* wasn't the only application from Winsoftware.com the Dog received a complaint about this month. Reader Angie Breakstone had a run-in with another of the company's products:**

*I recently bought and downloaded **WinAntiVirus Pro** from the Internet and immediately started having memory problems with my computer. To make a long story short, I took my computer to a highly recommended local computer repair business and they removed it and the problems went away.*

When I contacted the company (which was quite difficult) for a refund, I was asked to download a program that "collects information on all applications running in your computer" before I would be issued a refund.

*Being uneasy, I printed the instructions and went back to the computer repair business and asked if I should do as requested. They emphatically told me I should not follow the instructions; they didn't believe any reputable business would want to do this and said they had never heard of **WinAntiVirus Pro**.*

What do you know about this business and do you think I can take a chance and do what they say, or should I just take the loss and chalk it up to experience? It makes me mad when I feel taken

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maxumumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

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advantage of; people need to know about this company.

—Angie Breakstone

The Dog had never heard of *WinAntiVirus Pro* until Angie pointed out the program, but it sounds like her computer shop's suspicions were well-founded. When the Dog queried several leading antivirus software companies, none had heard of *WinAntiVirus Pro*, either. The Dog's emails to WinAntiVirus.com went unanswered, but there is some info from security guru Eric Howes, who runs SpywareWarrior.com. Howes' site says *WinAntiVirus Pro* uses "false positives" to goad users to purchase the program. And the site says the software also features an "inappropriate collection of Personally Identifiable Information." A quick search of the Internet reveals consumers who allege they were tricked into upgrading to the AV program after a pop-up told them their current application was expired.

Obviously, the Dog recommends that readers avoid these two applications (and others available from Winsoftware.com), but how do you know if some other anti-spyware program is real or not? The Dog recommends that you visit SpywareWarrior.com and take a gander at the list of rogue applications. SpywareWarrior lists more than 200 applications that claim to be anti-spyware but are usually nothing more than spyware, adware, or plain obnoxious. As for Angie, if WinAntiVirus.com won't provide a refund unless she runs another of its programs, she should just chalk the matter up to experience.

F-MINUS

I ordered a set of Lexmark inkjet cartridges three weeks ago from EZInkjets.com, and the order was processed the next day according to my credit card statement. I have yet to receive the item, however, and have yet to receive an email from the company. I looked on the Internet and saw many complaints about the company, which worries me. I called the company about this issue, and the phone line has a recording that says: "We are currently experiencing a high volume of calls, if your cartridge has not arrived for 10 days, please email shipping@ezinkjets.com." Could you help me out?

— Jennifer

A quick check of the Better Business Bureau's database (www.bbb.org) would tell you that EZInkjets.com is not a place to spend your hard-earned cash. The company has received a solid "F" rating from the L.A. branch of the Bureau. And that F isn't on the typical A-to-F scale, either—it's *way* down there (see scale on the left). So the F EZInkjets.com received for the 135 complaints against it is more like an F-minus, minus, minus, minus. In school, that's like the teacher failing you and the two people next to you just for being near you. That's not good, and the BBB, which is usually conservative in its ratings, says of those who get the super F: "We strongly question the company's reliability for reasons such as they have failed to respond to complaints, their advertising is grossly misleading, they are not in compliance with the law's licensing or registration requirements, their complaints contain especially serious allegations, or the company's industry is known for its fraudulent business practices."

Your easiest course of action, if you haven't taken it yet, is to call your credit card company and dispute the charge after a reasonable period of time. Make sure you fill out the paper work the credit card company sends you for the dispute to be valid. *Maximum PC* readers, obviously, are advised to avoid shopping at stores that receive the F rating from the BBB. Woof!

As you can see, it takes a lot of work to get an F rating from the BBB, but EZInkjets.com has done just that.

ATOMIC FICTION?

I'm wondering about the legitimacy of a company that was in the news for its laptop computer, which boasts specs well beyond those of most desktops. Its website, Atomchip.com, certainly references a whole lot of confidence-inspiring organizations, such as the U.S. Patent Office and the Consumer Electronics Show. There are also photos of the innards of its notebook offering, in which a plug resembling a standard headphone connector is used as the "decoder/transceiver." While I don't know why that couldn't be done, it just seemed a little funky to me when I saw it. Anyway, I was hoping you could investigate.

— David Ringo

The Dog isn't certain what Atom Chip actually does, but from examining the website and the purported specs of the portable computer, the Dog believes we'll see Mach 3 stealth pigs with VSTOL capability before this notebook is actually sold. Why? It's not simply the cheesy feel of the website that inspires skepticism, but also the extreme unlikelihood of a "6.8GHz AtomChip Quantum II widescreen notebook… With up to 500GB of AtomChip Quantum-Optical Non-Volatile RAM storage or a 1TB Quantum Storage ATA-IDE." As far as the patent claims, some are legit. The U.S. Patent Office has granted several patents to Shimon Gendlin, who runs Atom Chip and an affiliated website, Computechnics.net.

Call the Dog cynical, but the days of small start-ups building technology that AMD, Intel, and IBM can't with their R&D budgets are long over. MPC

Recall Alert

Nikon is recalling some 710,000 digital camera batteries that may short-circuit, overheat, and melt. The company has had four reports of melting batteries resulting in injuries. About 200,000 of the EN-EL3 batteries were sold with and for the Nikon D100, D70, and D50 digital SLR cameras in the U.S. The list of bad batteries is too long to list here but is available at www.nikonusa.com. If your battery is bad, immediately stop using it and contact Nikon USA at 800-645-6678. The company will replace bad batteries within 7 to 10 days, for free.

Nikon has recalled 700,000 batteries for its D100, D70, and D50 digital cameras.

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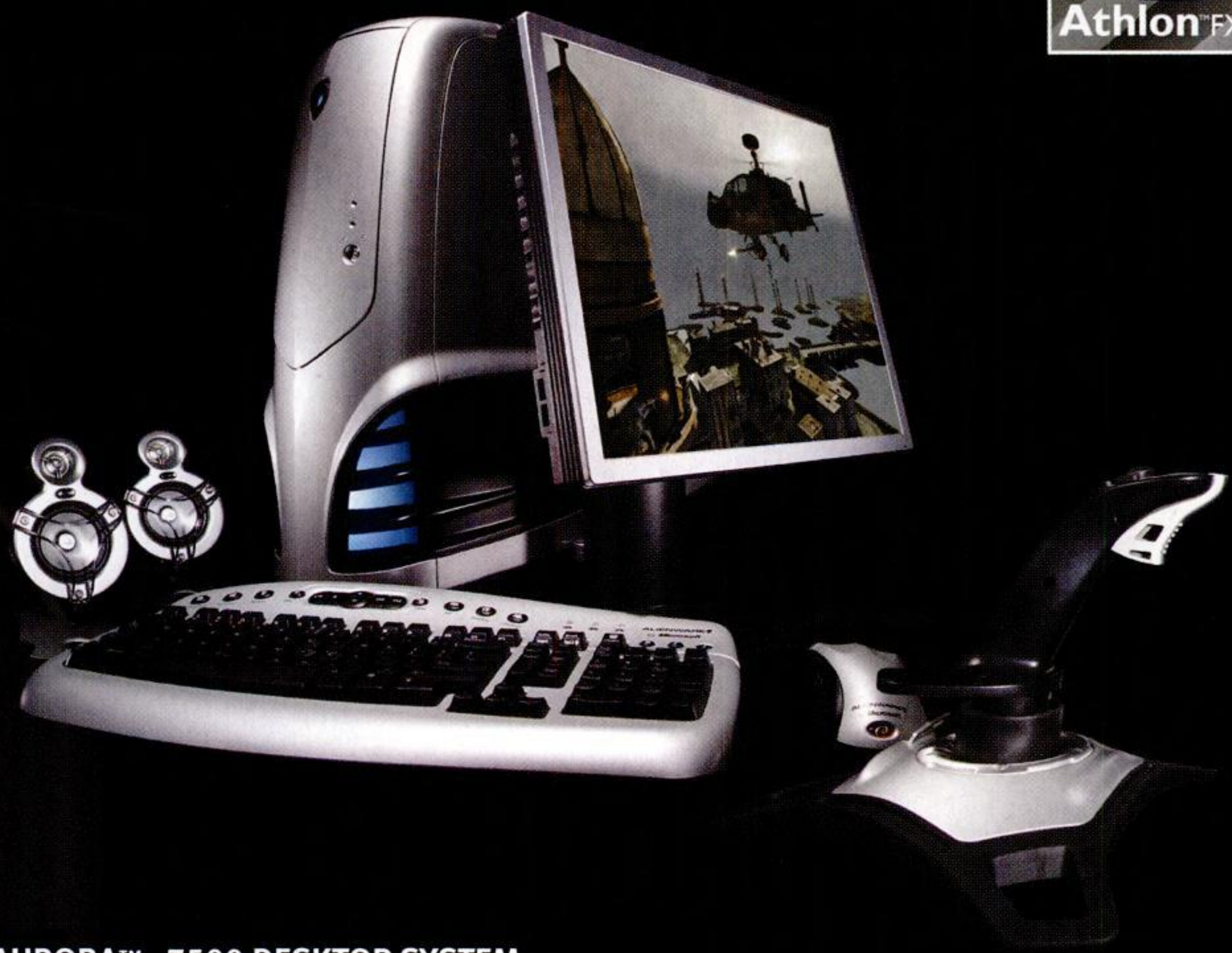
Alienware recommends Microsoft® Windows® XP Professional.



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VERSUS!

Tina Turner said it best in *Beyond Thunderdome*, "Two men enter. One man leaves." Our legal counsel won't let us pit editors against each other in a to-the-death battle, but they have no such compunction when it comes to PC hardware. So we put the best gear on the planet to the ultimate test.

When it comes to testing, *Maximum PC's* mantra is *real-world, real-world, real-world*. The only way to find out if a piece of hardware deserves your loathing or lust is to test the hell out of it, and that's what we do best. This month, each editor retired to the Lab with hardware from his or her beat, then devised a series of fiendishly clever tests to separate the winners from the wimps, the wheat from the chaff, the Donovan McNabbs from the Terrell Owens.

Whether you want to know who makes the

PHOTOGRAPHY BY MARK MADEO

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We put arch rivals from every category—CPU, videocard, hard drive, and monitor—in Maximum PC's version of the Thunderdome. Which gear will survive, which will die? Could your hardware meet the challenge?

best midrange, dual-core CPU, or which budget videocard you should avoid, we've run the benchmarks, and we're here to give you the *real-world* winner! If you can't handle the truth about hardware, you'd best skip this story altogether. When you're ready, turn the page.

INSIDE

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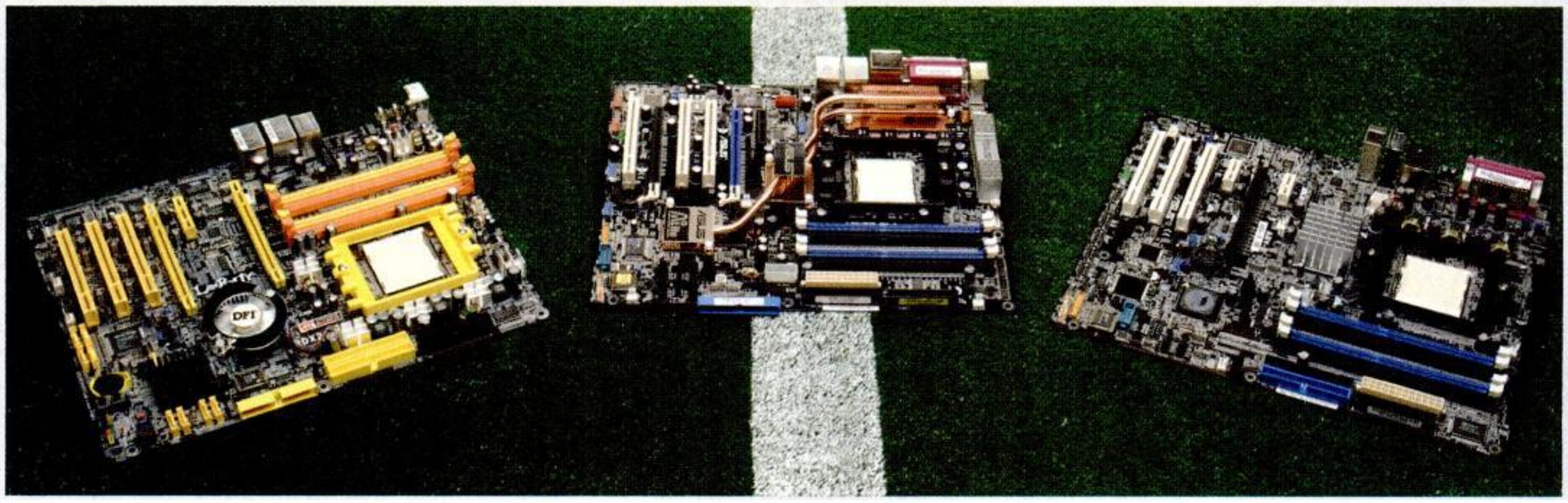
BEST ATHLON 64 CHIPSET

If you think chipset performance doesn't matter for Athlon 64 CPUs, you're dead wrong. We pitted ATI's new CrossFire chipset, nVidia's new dual X16 chipset, and VIA's latest PCI-E offering against each other to find the fastest chipset for the Athlon 64



nVidia's dual x16 PCI Express slot-equipped nForce4 X16 chipset (center) spanked VIA's (right) and ATI's chipsets.

THE TESTS

For our showdown, we tapped Asus for its new A8N32-SLI Deluxe mobo ($250, **www.asus.com**). The board uses nVidia's nForce4 SLI X16 chipset, which is the first consumer chipset to feature two x16 slots for dual graphics cards. That's 8GB/s of data for each graphics card, double the bandwidth of a dual-x8 configuration. DFI's LANParty RDX200 CF-DR ($200, **www.dfi.com.tw**) represents ATI's new Radeon Xpress 200 CrossFire chipset. ATI has had some success with its integrated graphics chipsets in AMD notebooks, and the company is now hoping to replicate that success on the desktop. To round out the bunch, we grabbed an Asus A8V-E SE ($100, **www.asus.com**) which uses VIA's K8T890 Pro chipset. Each mobo was equipped with an Athlon 64 FX-57, 1GB of Corsair DDR400 RAM, a Seagate SATA 160GB drive, and a reference GeForce 7800 GTX card. All of the motherboards use the latest BIOS and drivers available from the chipset vendor.

We chose a variety of benchmarks that reflect overall system-level performance, rather than pure graphics or gaming performance.

THE RESULTS

Most people—including us—have long felt that with the memory controller integrated into the CPU, the chipsets have become less relevant on the Athlon 64 platform. Our contest between three of the top chipsets for the platform tell a different story. Given the same videocard, which chipset is the fastest? The quick answer is nVidia's new nForce4 SLI X16 chipset. Not every test run showed a decisive margin in the X16's favor, but combined they reveal an overall trend—the X16 is the fastest. The only area the X16 didn't dominate was in hard drive performance under *PCMark 2005.* There we saw VIA's K8T890 Pro take the lead. The hard drive performance gap was wide enough to give VIA a win in *PCMark 2005* as well.

In memory performance and graphics performance, however, the X16 is unparalleled. The surprise was that VIA's K8T890 Pro, which has been linked to budget boxes because it lacks dual-card support, was the runner up, spanking ATI's CrossFire chipset. We had high hopes for ATI's answer to SLI, but the Radeon Xpress was less than stellar. Its hard drive performance lagged the X16 and VIA by a good 5 percent and it didn't win a single benchmark. While the gap between the fastest and slowest was relatively thin, why wouldn't you choose the obvious winner?

WINNER

NVIDIA NFORCE4 SLI X16

+ FANTASTIC FOUR

Dual x16 graphics slots for future-proofing and overall better performance.

– FAB FOUR

Come on kids, can't we have a uniform dual-card spec?

THE BOTTOM LINE

You know the nForce4 SLI X16 is the fastest, but what that means in real-world terms is as clear as mud. In the good old days, you picked your CPU, then chose a chipset, and bought whatever graphics card was the fastest. Today, that doesn't work. First you have to decide whether you'll ever want dual graphics cards. Then you have to pick the videocard vendor you want, further limiting your chipset options. In AMD land, that means nForce for SLI or Radeon Xpress 200 for CrossFire. For consumers dead-set on ATI videocards, you have no choice. That won't stop us from placing the crown on nVidia's head for the nForce4 SLI X16, but we're not happy there isn't a uniform standard for dual graphics-card mobos.

BENCHMARKS

	VIA K8T890	ATI RADEON XPRESS 200	NVIDIA NFORCE4 SLI X16
3DMARK05 CPU	5,770	5,920	**6,136**
3DMARK01 SE	30,206	29,527	**30,603**
3DMARK03	16,672	16,686	**16,831**
QUAKE III (FPS)	544	547	**564**
AQUAMARK III CPU	12,350	12,317	**12,825**

Chart is a representative sample of all benchmarks run. Best scores are bolded.

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BEST PENTIUM CHIPSET

Can nVidia's dual x16 PCI-E chipset pull a back-to-back win, taking out Intel's 955X chipset too? We threw the brand-new, nForce-powered Asus P5N32-SLI into the pit with the feature-rich, Intel-backed Asus P5WD2 board to find out

THE TESTS

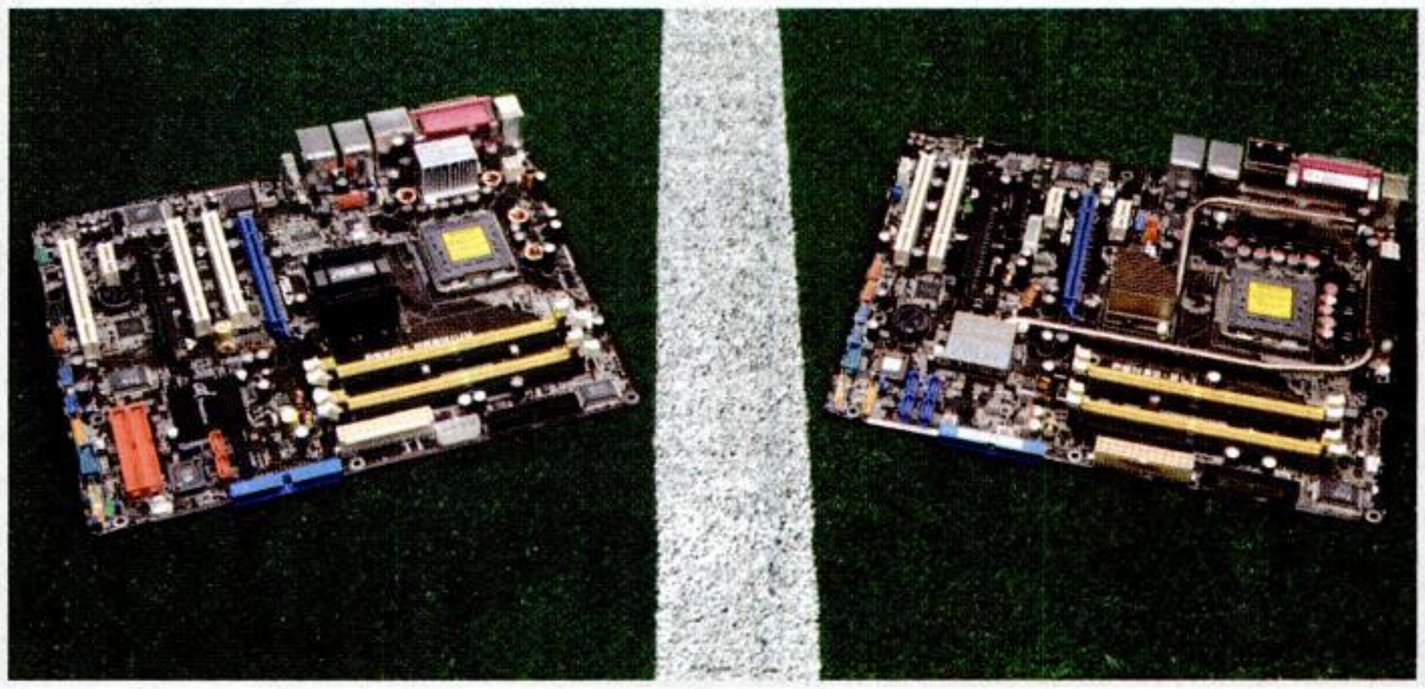
Since its debut, Intel's 955X has had an uphill battle. Sure, it was the only chipset that would run all Intel dual-core CPUs, but it lacked SLI support. And before Intel could cajole ATI into supporting CrossFire on the 955X, nVidia released its own LGA775 chipset with SLI support. With Intel on the cusp of releasing the 975X—which is rumored to support both SLI *and* CrossFire—is the 955X relevant anymore? To find out, we pitted the old chipset, represented by Asus' P5WD2 ($200, **www.asus.com**), against nVidia's new nForce4 SLI X16 chipset, represented by Asus' P5N32-SLI board ($250, **www.asus.com**).

Like its AMD sibling, the P5N32-SLI boasts two x16 PCI-E-capable slots. A total of 40 PCI-E lanes live in the nForce4 SLI X16—two more than the AMD version. For our tests, we used an Intel 3.73GHz Pentium 4 Extreme Edition with 2MB of cache on the 1066MHz FSB, 1GB of Crucial Technology DDR2/667, an nVidia GeForce 7800GTX, and a 160GB Seagate SATA drive. BIOSes were updated to the latest available and we used the latest drivers from the chipset manufacturers as well.

Because our goal is to show off the prowess of the chipsets, and not the videocards, we chose our benchmarks with care. Eschewing videocard-specific tests, we picked tests that stress memory bandwidth, disk controllers, and PCI Express speed.

THE RESULTS

The last time we pitted the 955X against an nVidia chipset (October 2005, Head2Head) the boards performed almost identically. Albeit, there was enough of a slight performance edge in the nForce4's corner that we could declare it the winner.



Asus' nForce4-powered P5N32-SLI (right) is feature-packed but its sibling, the Intel 955X-based P5WD2, doesn't go down without a fight

Despite newer BIOSes, newer drivers, and a different videocard, we saw the same damn thing. Sure, in some categories one chipset would win. The 955X was 3 percent faster in *Quake III Arena,* for example, while the X16 was about 2 percent faster in *3DMark01 SE.* The 955X also offered a tiny bit more overall memory bandwidth in *Sandra 2005* and in the CPU portion of *3DMark05.* In other benchmarks, from *3DMark03* to *PCMark05* to *AquaMark*, it was pretty much a tie. We ran 14 different benchmarks for the chipsets. Seven went to nVidia and seven went to Intel. In terms of performance, we have to declare this one a tie.

WINNER

NVIDIA NFORCE4 SLI X16

+ POGO PLANE

The promise of full x16 performance for each videocard in SLI means the X16 chipset could have a longer life.

– OSPREY

As we said before, will someone please agree on a fracking dual videocard standard?

THE BOTTOM LINE

For the 955X, a tie is a victory on the performance front. When you consider that Intel has already marked the 955X for the scrap heap to make way for the 975X, a dead heat with nVidia's best and brightest ain't that bad. For nVidia, a performance tie is bad, but not the end of the world. Sales of the X16 will hinge on the dual graphics-card support and that gives the advantage to the X16. While the 955X has nominal dual-card support from ATI's CrossFire, the momentum is with nVidia. Without a CrossFire X1800 XT option, who the hell wants dual Radeon X850XT cards? With support for two x16 PCI-E slots, the X16 also has an advantage when graphics cards actually need the bandwidth.

We do have to note, however, that nVidia's approach has a potential design issue. The chipset features 20 PCI-E lanes to the north bridge and 20 lanes to the south bridge. With 8.8GB of potential data going to the one videocard in the north bridge and another 8.8GB going to the south bridge, performance could be contingent on the performance of the interconnect between the north bridge and south bridge. The company hasn't disclosed the interconnect speed, saying there's plenty of bandwidth for today's applications and those just over the horizon. The company also says the two chips can access system RAM independent of each other, which lowers bandwidth requirements.

In the here and now, the X16 offers enough bandwidth for today's games. And when you consider that the X16 lets you run SLI, while Intel's board restricts you to CrossFire, it's really easy to declare the X16 as the winner of this showdown.

BENCHMARKS

	INTEL 955X	NVIDIA NFORCE SLI X16
3DMARK05CPU	**5,986**	5,719
3DMARK01 SE	26,347	**26,834**
3DMARK03	16,901	**16,924**
QUAKE III (FPS)	**500**	485
AQUAMARK III CPU	**11,547**	11,523

Chart is a representative sample of all benchmarks run. Best scores are bolded.

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BEST MIDRANGE DUAL-CORE CPU

When Intel's $500 dual-core Pentium 4 and AMD's dual-core Athlon face off, which one will be victorious?

THE TESTS

For our dual-core showdown, we selected two comparably priced dual-core processors from Intel and AMD. We chose Intel's Pentium D 840 ($540, **www.intel.com**), which clocks in at 3.2GHz with 1MB of L2 cache per core. The chip uses Intel's 90nm process and is nothing more than two Pentium 4 Prescott cores in a single package. For AMD, we picked the Athlon 64 X2 4400+ ($500, **www.amd.com**). This dual core weighs in at 2.2GHz and features 1MB of L2 cache per core, as well. Like the Pentium D, it uses a 90nm process. We used the same nForce4 SLI X16 motherboard from our chipset showdown for each chip, and the same videocard, drivers, RAM, BIOS and hard drives, as well.

In addition to the benchmarks we used for our CPU showdown, we also tossed BAPCo's *SYSmark2004* into the mix. This benchmark uses more than a dozen industry-standard applications to measure a CPU's speed. Because *SYSmark2004* uses multitasking and multithreaded apps, both multicores performed admirably, especially when you consider their price.

The Athlon 64 X2 4400+ (left) runs circles around Intel's Pentium D 840.

THE RESULTS

There's not much to say here, except that the X2 is clearly the winner. In all but one test, the X2 outran the Pentium D by a considerable margin. The X2's performance in games was especially notable, downright spanking the Pentium D.

WINNER: AMD ATHLON 64 X2 4400+

+ X-MEN
Awesome gaming performance with very good application performance.

– X-GENERATION
All Socket 939 boards and processors will be obsolete next year when AMD introduces DDR2 support.

THE BOTTOM LINE

The Pentium D 840's loss is quite stunning when you recall that the Pentium Extreme Edition 840 is exactly the same as the less expensive Pentium D 840, but with Hyper-Threading enabled. That Intel's fastest Pentium D isn't competitive with AMD's third-string dual-core isn't a good sign for the current iterations of the dual-core Pentiums. The Pentium D just doesn't have enough L2 cache or clock speed to be competitive; it might take a move to a new dual-core architecture for Intel to get back in the game.

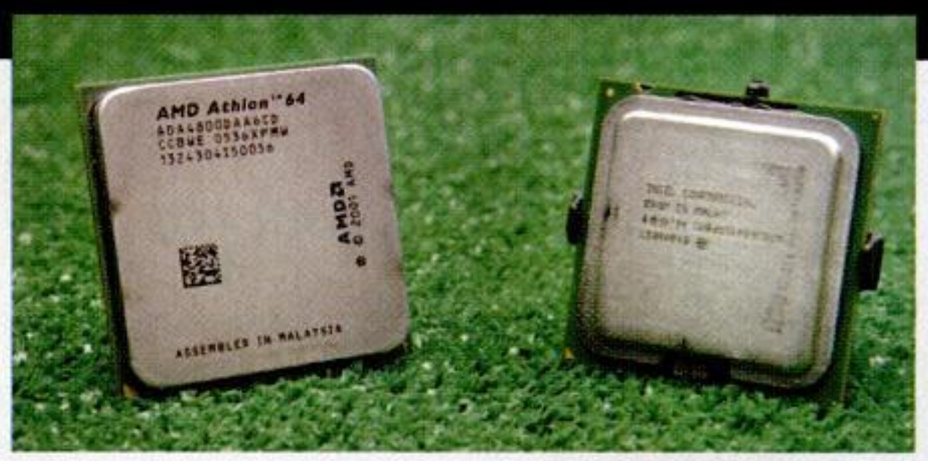
BENCHMARKS

	ATHLON 64 X2 4400+	PENTIUM D 840
SYSMARK2004 OVERALL	**218**	191
3DMARK05 CPU	**6,041**	5,216
3DMARK2001 SE	**28,341**	22,214
QUAKE III	**445**	327
AQUAMARK III	**90,091**	81,142
PCMARK 2005 CPU	4,522	**4,608**

Best scores are bolded.

BEST HIGH-END DUAL-CORE CPU

Both Intel and AMD agree that dual- and multicore CPUs are the future. But whose is the best right now? Here's the performance breakdown of both companies' top-of-the-line offerings



The Athlon 64 X2 4800+ (left) makes a mockery of the Pentium Extreme Edition 840.

Experts derisively describe Intel's Pentium Extreme Edition 840 ($1,030, **www.intel.com**) as a pair of Pentium 4 Prescott cores super-glued onto the same die. When you also factor in that the Prescott core doesn't hit its performance peak until the 4GHz-plus range, the Pentium Extreme Edition 840 at 3.2GHz isn't going to set any new records despite its dual-cores with Hyper-Threading.

AMD's Athlon 64 X2 4800+ ($790, **www.amd.com**), on the other hand, is a "real" dual-core CPU. It uses a shared memory controller and crossbar, which allows direct communication between the cores. Given the Athlon 64's 2.4GHz and 1MB of L2 cache per core, we figured this would be an ugly match.

And it was. In every single gaming benchmark we ran, the 2.4GHz X2 4800+ was the winner. Whether *Doom 3* or *3DMark*, the fast performance of the X2's on-die memory controller pushed it ahead of the Pentium Extreme Edition 840.

WINNER: AMD ATHLON 64 X2 4800+

The 840 does find some redemption in application performance, where it's got a small advantage in Adobe *Premiere Pro* and *DVD Shrink*. However, the X2 won *Photoshop CS*, *Nero Recoding*, and a handful of multitasking tests. It's not much of a contest. The 840 has one hidden talent, though—with adequate phase-change or water-cooling to keep the heat down, the 840 is one hell of an overclocker. That doesn't help the average user, however, thus rendering the Athlon 64 X2 the hands-down high-end dual-core winner.

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BEST HIGH-END SINGLE-CORE CPU

The last ride of the single-core might as well be a fast one. We took AMD's FX-57 for a drag race alongside Intel's 3.73GHz Pentium 4 Extreme Edition

The 3.73GHz Pentium 4 EE (left) and Athlon 64 FX-57 might be the last of their kind, but at least they're fast!

To test the single-core CPUs, we used the winning components from our chipset showdowns, with the AMD FX-57 ($1,000, **www.amd.com**) and the 3.73GHz P4 EE ($1,000, **www.intel.com**) running on their respective variants of the nForce4 SLI X16 chipset.

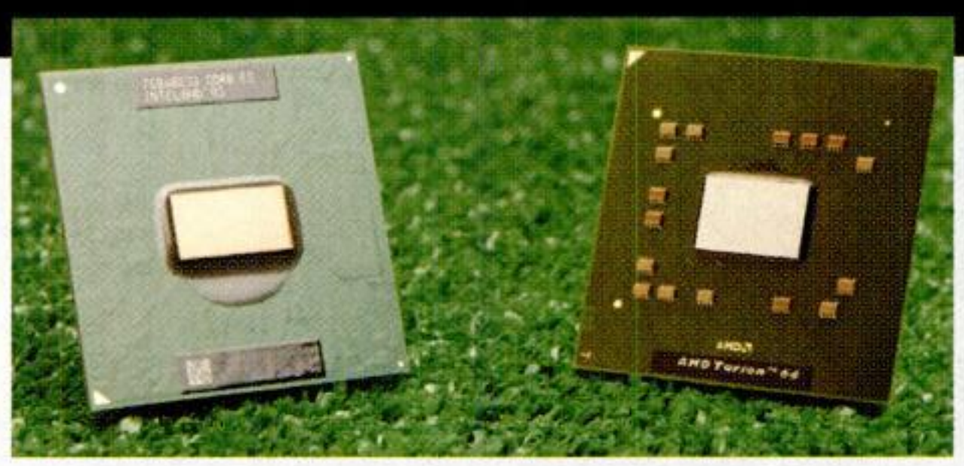
We added the *SYSmark2004* benchmark to our CPU runs in addition to the full suite of tests. Unlike the midrange dual-core showdown that saw the Athlon X2 kick the Pentium D's ass up and down the benchmark school yard, the 3.73GHz Pentium 4 managed to eek out some significant wins. In *SYSmark2004*, the P4 took the top honors with an overall score of 221, besting even the dual-core X2, the runner up. The good news stopped there though, as the FX-57's fearsome reputation for gaming gave it the easy win in all our game-oriented tests. The P4 is just slower than the FX-57 in gaming.

WINNER: ATHLON 64 FX-57

SYSmark2004 is an important benchmark, but we have to admit that it isn't as important as gaming performance. We'd rather wait an extra three-tenths of a second for our Microsoft *Word* mail merge to finish than take a 10 percent hit in gaming. The FX-57 is the winner.

BEST MOBILE CPU

Battle of the little brothers: The Athlon 64 FX has kicked Pentium 4 ass since day one, but can its little brother, the Turion 64, do the same against the P4's young sibling, the Pentium M? We match twin Fujitsu notebooks equipped with each processor to determine the winner



The new Turion 64 (right) is a mobile derivative of the K8 core and has been hyped as a Pentium M killer.

THE TESTS

Benchmarking notebook CPUs ain't like dusting crops, boy. Sure, you can test the CPUs in desktop motherboards, but that doesn't tell you how they perform in the field.

To get the most accurate results, we turned to Fujitsu's Lifebook S2110, which uses the AMD Turion 64 MT-28 ($145, **www.amd.com**) and Lifebook S6240, using the Intel Pentium M 740 ($270, **www.intel.com**). These twin notebooks sport the same display, optical drive, battery, power brick, and even the same track pad. The main differences are CPU, motherboard, associated system-level chips, and RAM types (DDR for the Turion and DDR2 for the Pentium M).

The CPUs run different clock speeds and cache sizes. The higher-clocked Pentium M rings in at 1.73GHz, which is about 8 percent higher than the T64's 1.6GHz. The latter sports just 512KB of L2 cache, while the Pentium M is equipped with 2MB of L2.

Naturally, we chose CPU-bound benchmarks for this contest, as we're more interested in raw CPU performance than overall system numbers.

THE RESULTS

We thought this would be all about the Turion, but even accounting for the 8 percent clock speed advantage, the Pentium M 740 is clearly the winner. In the *PCMark 2005* CPU test, the Pentium is 29 percent faster. In *PCMark's* RAM test, it's 19 percent faster. The Turion/ATI graphics combo actually edges the Pentium M/Intel graphics in the overall *PCMark* score, but that's more the result of ATI's superior graphics performance over Intel's integrated hardware.

WINNER: PENTIUM M

+ SILVER SURFER
Better battery life and more performance than the new Turion 64.

– COUCH SURFER
Where's the 64-bit support, Intel?

In our *Premiere Pro* test the Pentium M held a commanding 36 percent lead. Only in *Photoshop CS* did the T64 find some small redemption with a 3 percent lead.

In the final test using BAPCo's *MobileMark 2005*, which tests how fast a processor runs real-world apps on the battery, the Pentium M won the performance category by 34 percent, while finishing with 9 percent longer battery life.

THE BOTTOM LINE

The Pentium M offers better performance and longer battery life. The T64, however, clearly leads in price. Despite sporting the exact same configuration, the Pentium M-based Lifebook cost about $150 more.

BENCHMARKS

	AMD TURION 64 MT-28	INTEL PENTIUM M 740
MOBILEMARK 2005 BATTERY LIFE	209 minutes	**227 minutes**
MOBILEMARK 2005 PERFORMANCE	137	**184**
PCMARK 2005 OVERALL	**1,685**	1,610
PCMARK 2005 CPU	2,166	**2,793**
PHOTOSHOP CS (SEC)	**571**	587
PREMIERE PRO (SEC)	1,090	**800**

Best scores are bolded.

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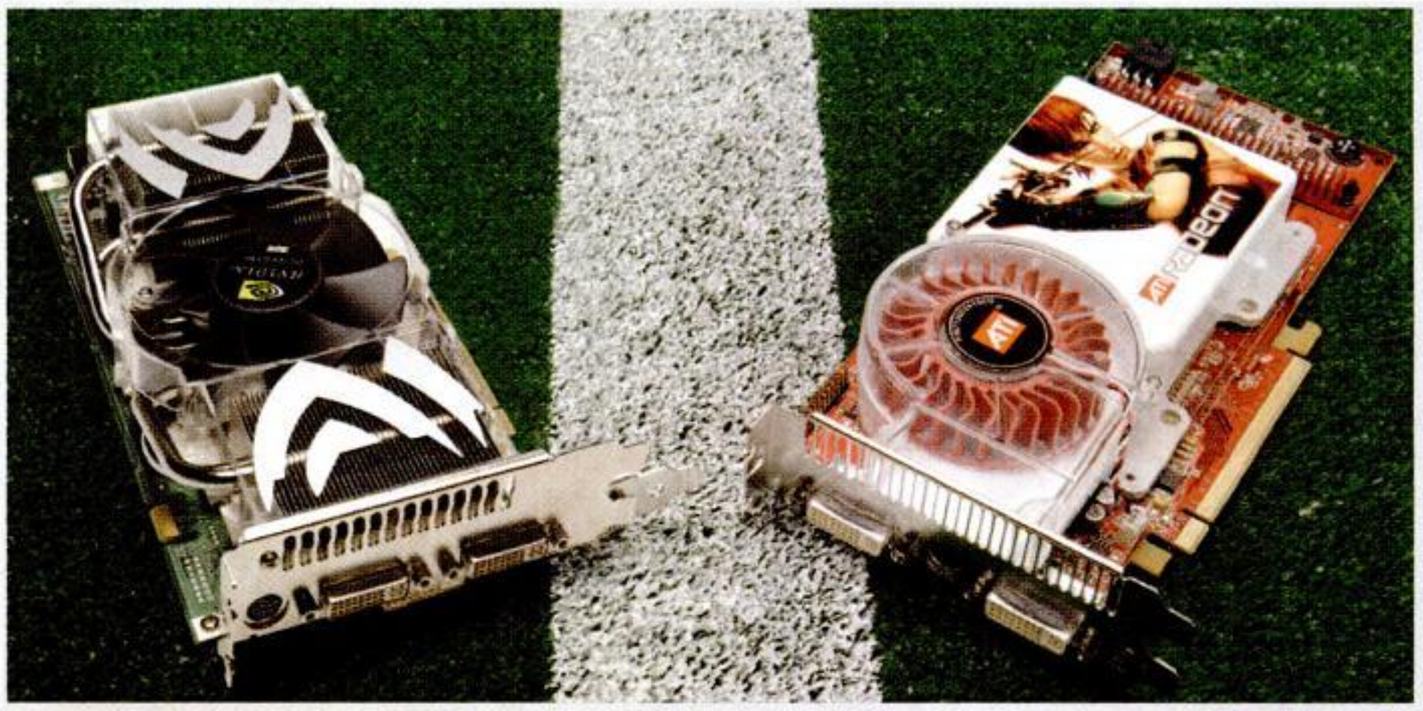
BEST HIGH-END VIDEOCARD

At the high end of the performance-videocard market, a supremely powerful GPU is no longer enough; top-drawer cards now come equipped with 512MB of GDDR3 video memory, too



We thought we'd seen the end of two-slot cooling solutions, but ATI's X1800 XT (right) and nVidia's GeForce 7800 GTX both sport them, thanks to high clock speeds and 512MB frame buffers.

THE TESTS

ATI has been pushing the frame-buffer envelope for months. First with the 512MB Radeon X800 XL, and then again with the Radeon X1800 XT ($550, **www.ati.com**). nVidia followed suit, first with the GeForce 6800 Ultra and now with a tweaked version of the GeForce 7800 GTX ($650, **www.nvidia.com**).

ATI tells us that game developers are pushing for more memory; nVidia just seems to be reacting. Whatever the motivation, our benchmark results indicate that for now, sheer GPU power is more important than tons of memory. No matter: The only way you can buy ATI's and nVidia's best GPUs is with 512MB of memory.

Our videocard benchmarks measure two critical aspects of performance: real-time 3D-graphics rendering and video playback. There's no point in measuring 2D performance, because even today's lowliest graphics chips deliver acceptable performance with productivity applications.

Games are the best way to measure real-time 3D performance, and so we use two basic types: Off-the-shelf retail games and synthetic demos designed specifically for benchmarking. Id Software's *Doom 3* is an acid test in terms of both its horsepower demands and its use of OpenGL. It's also one of the few games that use more than 256MB of memory (in Ultra Quality mode). Cards that perform well with *Doom 3* can also be expected to deliver good performance with games based on the same engine, including *Quake 4*.

We added Monolith's *FEAR* to our benchmarking suite solely for these top-end cards because it's one of the most graphically sophisticated DirectX 9.0 games we've seen. *Far Cry* and *Halo* round out our real-world gaming benchmarks.

Our synthetic 3D benchmarks consist of Futuremark's *3DMark03* and *3DMark05*. These tests make extensive use of particle animation, volumetric fog, dynamic shadows, and other visual effects. Because Futuremark doesn't need to worry about backward compatibility with older videocards, its benchmarks are harbingers of what we can expect to see in future games.

Believe it or not, the latest videocards have a much tougher time playing DVD movies than they do games. We use Silicon Image's supremely challenging *HQV Benchmark DVD* to evaluate everything from picture detail, to film-cadence detection, to noise reduction.

WINNER
NVIDIA GEFORCE 7800 GTX (512MB VERSION)

THE STAND (THE BOOK)
Wicked-fast 3D acceleration, decent video performance, innovative cooling solution.

THE STAND (THE MOVIE)
Two-slot cooler, expensive.

THE RESULTS

ATI and nVidia took decidedly different approaches with their latest GPUs. ATI moved to a 90nm manufacturing process for its X1000 series, which allows clock speeds to be ratcheted to insane levels. The reference-design X1800 XT we tested checks in at a staggering 631MHz, and its GDDR memory is clocked at an astronomical 752MHz.

nVidia, meanwhile, stuck with a 110nm process for its 7800 series, and a relatively staid core clock speed of 430MHz for the 256MB version of the 7800 GTX. But nVidia pulled a rabbit out of its hat for the 512MB version of the 7800 GTX: The tweaked core on the new card runs at 550MHz.

Despite the clock-speed advantage, ATI's 16 pixel-pipeline X1800 XT proves to be no match for nVidia's latest 24-pipe monster. The 512MB 7800 GTX absolutely creams the X1800 XT in *3DMark03*, besting ATI by nearly 3,000 points. And where nVidia's champion delivers *Doom 3* at 1600x1200, Ultra Quality to the tune of 71 frames per second, ATI's contender mustered just 58.2fps.

The news only gets gloomier for ATI when we turn to *FEAR*. The 512MB 7800 GTX delivered a playable average frame rate of 36fps according to the game's internal benchmark tool. The X1800 XT managed only a barely playable 28fps.

And as tough as the *HQV* benchmark is on nVidia (the 7800 GTX scored just 56 out of a possible 130 points), it was absolutely brutal to ATI's X1800 XT, which managed to squeeze out just 38 points.

THE BOTTOM LINE

In our previous comparisons of the X1800 XT and the 7800 GTX, ATI bested its rival in some tests and came up short in others. This time, there's absolutely no contest.

BENCHMARKS

	ATI X1800 XT	NVIDIA 7800 GTX
DOOM 3 (FPS)	58.2	**71.0**
FEAR (FPS)	28.0	**36**
FAR CRY (FPS)	102.1	**121.8**
HALO (FPS)	108.0	**125.0**
3DMARK05	9,108	**9,497**
3DMARK03	16,918	**19,710**
HQV SCORE	38	**56**

Best scores in each category are bolded. Halo tested at 1600x1200 with sound disabled. Doom 3 tested at Ultra Quality, 1600x1200, 4x AA. Far Cry, FEAR, and 3DMark03 tests run at 1600x1200, 4x AA, 8x aniso (soft shadows enabled in FEAR). 3DMark03 and 3DMark05 run using default settings.

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BEST MIDRANGE VIDEOCARD

Looking for the best bang for your buck? Find out which GPU hits the sweet spot, delivering excellent frame rates and the same video-processing quality as the big boys

Leadtek's nVidia-powered WinFast 7800 GT TDH Extreme (left) out-muscled and out-hustled Sapphire's ATI-powered X1800 XL in our midrange videocard face-off, thanks to an abundance of pixel pipelines.

The Radeon X1800 XL is the less expensive cousin of ATI's top-of-the-line X1800 XT. As such, it's the natural competitor to nVidia's GeForce 7800 GT, the downscale relative of the 7800 GTX.

Here again, ATI and nVidia chose divergent design paths, with ATI focusing on core and memory clock speeds at the expense of pixel pipelines. In Sapphire's implementation, both the X1800 XL and its GDDR3 memory are clocked at a stock 500MHz ($370, www.sapphiretech.com). Leadtek chose to nudge nVidia's 7800 GT reference design to 450MHz for the core, and the memory to 525MHz ($395, www.leadtek.com). Both cards feature 256MB frame buffers.

And again, the X1800 XL's 16 pixel pipelines proved to be no match for the nVidia card's extra four pipes, despite the significant advantage in clock speeds. nVidia's margin of victory in game performance was closer in this price range, but the difference was more than enough to compensate for the slightly higher price tag on Leadtek's board. And when you take video-processing performance into account, Sapphire's offering is completely overwhelmed.

The benchmark results for *3DMark05* were particularly close, with nVidia beating ATI by just 172 points. The difference in real-world gaming performance, however, was much more significant, especially with *Doom 3*. Which would you rather experience: a respectable 51.7fps at 1600x1200 with the 7800 GT, or a paltry 36.2fps with X1800 XL?

And as we saw at the high end, nVidia clobbers ATI when it comes to video processing. The X1800 XL had a very difficult time with the *HQV Benchmark DVD,* scoring zero points in several tests.

BENCHMARKS

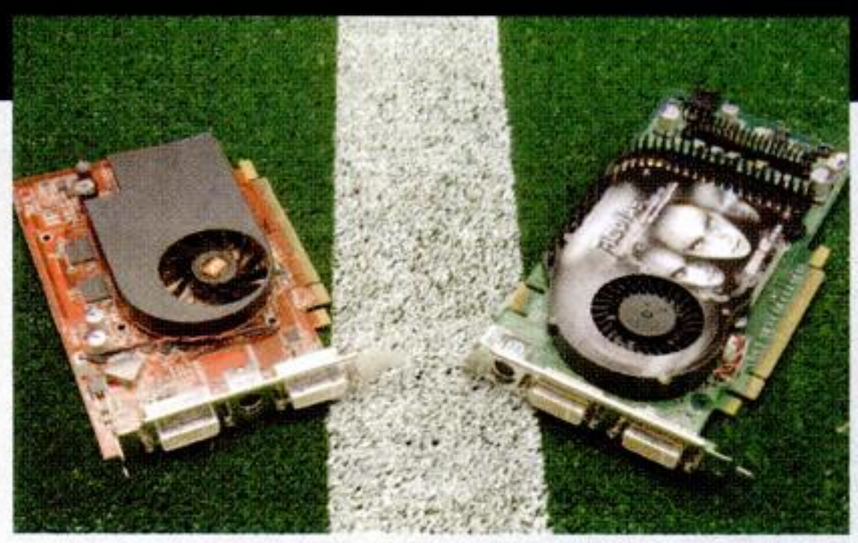
	SAPPHIRE X1800 XL	LEADTEK WINFAST
DOOM 3 (FPS)	36.2	**51.7**
FAR CRY (FPS)	80.7	**85.6**
HALO (FPS)	77.6	**98.5**
3DMARK05	7,300	**7,472**
3DMARK03	13,692	**15,946**
HQV SCORE	38	**56**

Best scores in each category are bolded. Halo tested at 1600x1200 with sound disabled. Doom 3 tested at High Quality, 1600x1200, 4x AA. Far Cry and 3DMark03 Game 2 and Game 4 tested at 1600x1200, 4x AA, 8x aniso. 3DMark03 and 3DMark05 run using default settings. HQV score is derived from the HQV Benchmark DVD.

WINNER: LEADTEK WINFAST 7800 GT TDH EXTREME

BEST BUDGET VIDEOCARD

Can't swing the bucks for a high-end or midrange videocard? We pit nVidia's 6800 GT against ATI's brand-new X1600 XT to see which GPU delivers the goods without busting the budget



If your budget absolutely won't stretch beyond $250, ATI's Radeon X1600 XT (left) will deliver Shader Model 3.0 compatibility. But AOpen's GeForce 6800 GT card will deliver much better performance.

When we say "budget," we're talking about the budgets that PC enthusiasts bring to the market. You won't find any $99 cheapies in this 3D-card cage-match, but you will find rivals ATI and nVidia duking it out once again.

We believe there are three essential features to look for when shopping for a budget videocard: Shader Model 3.0 support, excellent 3D-graphics acceleration, and solid video-processing performance. ATI needed a new generation of GPU in order to deliver SM 3.0 support, so it cooked up a whole range of new 90nm parts, including the 12-pipe X1600 GT reference design reviewed here ($250, www.ati.com). nVidia's older 6-series GPUs already supported Shader Model 3.0, so the company has concentrated on releasing new iterations of those parts to compete with ATI's—like the AOpen Aeolus 6800 GT we tested here ($275, www.aopen.com). We chose to stick with the GeForce 6800 GT because it delivers 16 pixel pipelines at a reasonable price.

Sure, you can buy ATI's X1600 XT and have enough money left over for a large pizza, but consider the performance you'd be sacrificing in exchange for a bit of undercooked dough and pepperoni: nVidia's budget GPU outperformed ATI's in all of our benchmarks save one. The delta in *Doom 3* performance was slightly smaller this time, 38.9 vs. 20.3fps, but *3DMark05* was the only category in which ATI could claim superiority. The X1600 XT's video-processing performance was dismal: it delivered a paltry *HQV* score of just 28.

BENCHMARKS

	ATI X1600 XT	AOPEN AEOLUS 6800 GT
DOOM 3 (FPS)	20.3	**38.9**
FAR CRY (FPS)	36.6	**70.0**
HALO (FPS)	44.1	**62.6**
3DMARK05	**5,306**	5,007
3DMARK03	9,693	**11,943**
HQV SCORE	28	**56**

Best scores in each category are bolded. Halo tested at 1600x1200 with sound disabled. Doom 3 tested at Ultra Quality, 1600x1200, 4x AA. Far Cry and 3DMark03 Game 2 and Game 4 tested at 1600x1200, 4x AA, 8x aniso. 3DMark03 and 3DMark05 run using default settings. HQV score is derived from the HQV Benchmark DVD.

WINNER: AOPEN AEOLUS 6800 GT

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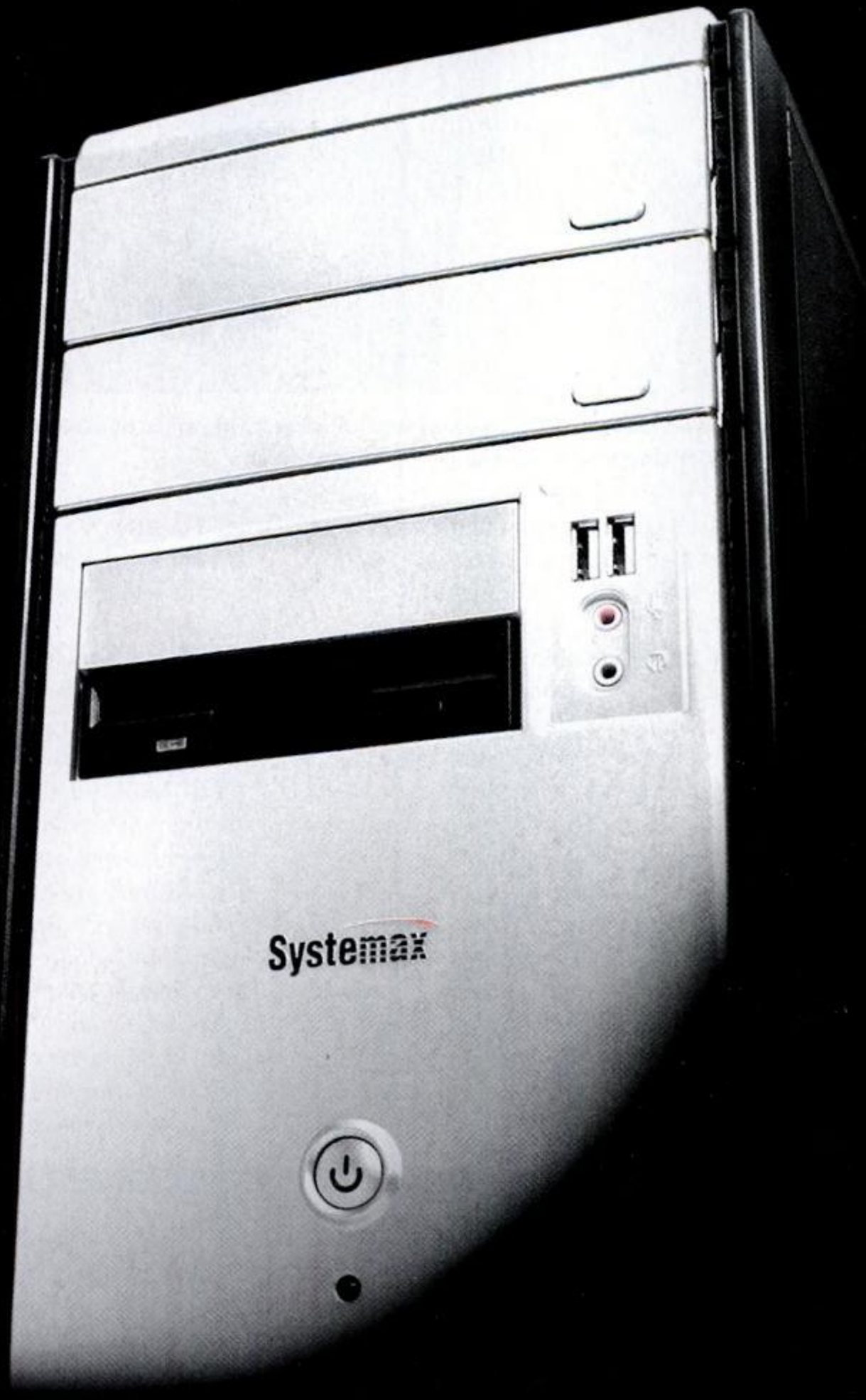

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BEST HIGH-CAPACITY HARD DRIVE

Next-gen, 500 gigabyte drives from Seagate and Maxtor have just arrived in the Lab, so they must defend themselves against the reigning champs, Western Digital and Hitachi

Seagate (far left) and Maxtor (far right) have released their 500GB dogs of war to attack Hitachi's 500GB Deskstar (middle left), while WD wades into the scrum with its own 400GB Caviar SE. This is going to get ugly!

THE TESTS

The *Maximum PC* testing procedures for hard drives comprise a delicate balance of real-world testing and synthetic benchmarks. The first synthetic benchmark we use is called *HDTach 3.0*. *HDTach* has been around for years and produces very reliable results. We use it to measure sequential read speed, which is the average rate at which data can be transferred from anywhere on the platter. Most drives are able to push more than 100MB/s on the outer edges of platters, but manage just 30MB or so on the inner rings of the platters, leaving us with an average in the 50MB range (for 7200rpm drives, at least). We also use this utility to measure burst rate and seek time. Burst rate is also known as "interface speed," while seek time is determined by the drive's rotational velocity.

Another synthetic benchmark we use is *H2benchw's* Application Index, which runs a script of seven "real world" applications, and then offers a score based on the amount of time it takes the drive to chew through the script. Our final synthetic test is *IOMeter*, which measures how many requests a drive can fulfill in a specific circumstance. For our tests, we load up a 512-byte read with 32 outstanding requests, make it 50 percent random and let her rip. This is as close as you can get to hard drive torture, while still obeying the Geneva Convention.

For real-world testing, we measure level load times in *Doom 3* and a 5GB file transfer, and we check the drive's operating temperature *sans* cooling using *Speedfan*.

THE RESULTS

As the benchmark chart shows, results varied wildly on a drive-by-drive basis. While all four drives sport a now-standard 16MB buffer, they have vastly different areal densities due to different capacities and platter configurations. For example, both the Maxtor DiamondMax 11 ($350, **www.maxtor.com**) and Seagate 7200.9 ($355, **www.seagate.com**) offer 500GB on four platters, while the Hitachi 7K500 ($355, **www.hgst.com**) sports a lower areal density with its five-platter design. The WD400KD ($215, **www.wdc.com**) drive also uses four

BENCHMARKS

	WESTERN DIGITAL WD400KD	SEAGATE 7200.9	MAXTOR DIAMAONDMAX 11	HITACHI 7K500
HD TACH 3				
RANDOM ACCESS TIME (MS)	**13.1**	13.3	15.5	13.9
BURST RATE (MB/S)	138	248	**254**	133
AVG. SEQUENTIAL READ (MB/S)	57	52.5	**59**	51.3
H2BENCHW				
APPLICATION INDEX*	29.7	27.4	**30.3**	29.3
OTHER				
DOOM 3 LOADING (SEC)	**30**	39	33	33
5GB READ (SEC)	**101**	109	111	102
IOMETER 50 PERCENT RANDOM WORKLOAD (IO/SEC)	230	250	**267**	244
OPERATING TEMP WITH NO FAN**	52	59	**51**	63

*Best scores are bolded. *The Application Index is a real-world script of six applications. The score is based on the time it takes the drive to complete the scripts. **Hard drive temperatures measured using S.M.A.R.T. data, as reported by the Speedfan utility.*

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100GB platters to achieve its comparatively low capacity of 400GB.

You can't judge a drive by the spec sheet, however. Despite being tied with the Maxtor drive for the highest areal density, the Seagate drive reports relatively low read-speeds, especially compared with the Maxtor drive and the WD Caviar. All four drives performed very close in the Application Index test, with the only "low" score registered by (once again) the Seagate 7200.9 drive.

The WD drive took the honors in both our real-world tests, while the Maxtor and the Seagate drives rang up top scores in our file-server *IOMeter* testing.

Though we don't specifically measure noise output with a microphone, all of the drives were "quiet" to our ears, especially at idle. You can't even tell they're running. During seeks, the Seagate drive was slightly more audible than the rest, but it was by no means loud. On the temperature front, the Hitachi and Seagate drives reported operating temps almost 10 C hotter than the WD and Maxtor drives.

THE BOTTOM LINE

In light of our test results, it's clear there's one drive here that kicks all kinds of ass—the Maxtor DiamondMax 11. However, there's a catch—and it's a big one. When we first hooked the DiamondMax to our nForce4 test bench, we could only read from the drive and not write to it. We got a second drive and suffered the same problem. It turns out there's an incompatibility between this drive and our nVidia chipset, which is a huge fiasco. We're even more concerned because Maxtor had the exact same problem with the DiamondMax 10! It's inexcusable, and therefore drops Maxtor from contention.

WINNER

WC CAVIAR SE 16 400GB (WD400KD)

+ CUDDLE

Extremely fast, very quiet, sexy even.

– HUDDLE

100GB less than its competitors.

Seagate obviously didn't make the podium with its surprisingly sluggish 7200.9 drive, which posted slower average sequential read speeds than its previous generation 7200.8 drive, for Pete's sake. Although its Application Index performance is slightly improved and it's 100GB larger than the previous drive, the performance difference between the two "generations" of drives is surprisingly similar.

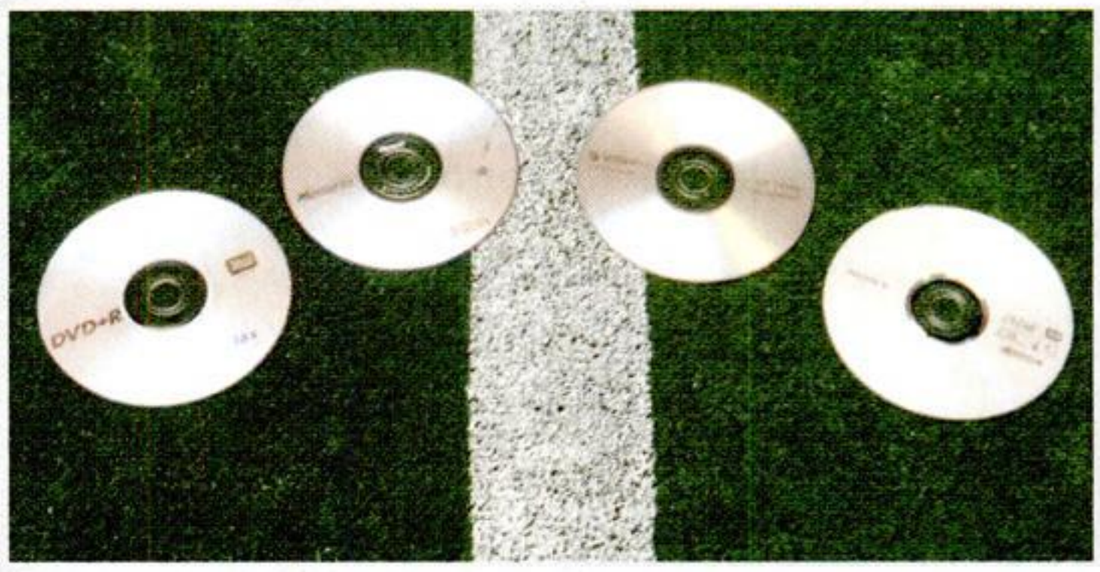
Hitachi's 7K500's stint at the top of the benchmark charts was short-lived thanks to the arrival of the WD Caviar SE16, which again owns the highest spot on the podium. The Caviar also won our "Gear of the Year" award (December 2005), and it will be retaining our recommendation until Maxtor fixes its issues. Though it offers 100GB less capacity than the other next-gen drives, it more than makes up for this deficiency with its cool and silent running and blazing-fast performance—in all of our benchmarks. This is truly a spectacular hard drive.

BEST RECORDABLE DVD MEDIA

Can you trust your burned DVDs?

With optical drives sinking to vending-machine prices, *Maximum PC* turns an eye to the other side of the equation—the media. We didn't need tests to confirm that all optical media is not created equal, but counting coasters is not exactly the best way to investigate disc quality.

We created several test DVDs from four major manufacturers with Plextor's PX-716A burner, then used *PlexTools Professional XL* to check two metrics—PIF (parity inner failures) and POF (parity outer failures). PI failures report how many uncorrectable errors were found per error-correction block; it sounds scary, but these are common and can be fixed by your drive's error-correction gizmos—a quality disc shouldn't return more than four of these. PO failures, on the other hand, are very bad news, signaling an error-correction block that is likely irreparable. Therefore, a disc should not return a single POF.



Handle with care: Even the most reliable DVD media relies on protection from scratches, fingerprints, and acidic alien blood.

In our tests, Fujifilm was the clear leader in disc quality, followed by Memorex and Verbatim, with Maxell bringing up the rear with barely acceptable results. Remember, however, that brand-name resellers sometimes switch their suppliers, so we recommend using a disc diagnostic like *PlexTools* (**www.plextools.com**), *Kprobe* (**www.cdrlabs.com/kprobe/**), or *CD/DVD Speed* (**www.cdspeed2000.com**, also bundled with most versions of *Nero*) to determine how reliable your media is for those backup jobs that are matters of life and death.

But using even the most reliable media in the whole wide world doesn't supercede common-sense precautions for valuable archives, such as turning on data verification in the burn process and handling your media with the same care you would with Grandma's bone china.

BENCHMARKS

	MEMOREX	FUJIFILM	VERBATIM	MAXELL
PI FAILURES	4	2	6	8
PO FAILURES	0	0	0	0

While PI failures are common and usually correctable, a high number means your disc is more prone to failure from normal wear and tear.

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BEST FAST LCD

Viewsonic's VX924 and Samsung's 940BF both boast a 4ms pixel response time—making them (theoretically) the fastest LCDs currently available on the US market. Which super-fast LCD is better, and is either one really *all that?*

If speed is what you're after, are you better off with Viewsonic's VX924 (right) or Samsung's 940BF on your team?

THE TESTS

In the past we've warned readers to be wary of pixel-response-time claims, and that's still true today. There's simply no industry standard for reporting the spec, making it an unreliable means of comparison. Nevertheless, pixel response times are an increasingly hot marketing tool, particularly geared toward gamers. It is, after all, the spec that describes a screen's refresh rate—or how quickly pixels change from one state to the next—so it can have a tremendous bearing on an LCD's ability to handle rapidly changing content, such as action-packed games.

Our purpose here is two-fold. First, we want to compare the two LCDs currently sporting a market–leading response time of 4ms: Viewsonic's VX924 ($470, **www.viewsonic.com**) and Samsung's just-released 940BF ($500, **www.samsung.com**). While there are likely variations in how each vendor arrived at its number, we do know that both Viewsonic and Samsung are referring to the pixels' change from "gray to gray" (as opposed to from black to white, or from black to white to black again), so the LCDs should be closely matched.

We also want to compare these supposed speed demons with an LCD that boasts a more average response time of 16ms—namely, Philips 190P5 ($580, **www.philips.com**), which received a 9 verdict and a Kick Ass award in our August 2005 LCD roundup. Will we even discern a performance difference?

With all three LCDs lined up side-by-side and connected to the PC via a DVI signal splitter, we compared their performance in the following apps: *DisplayMate's* LCD script, which isolates a screen's abilities in key areas and reveals even the most minute flaws; *Need for Speed Underground 2,* a racing game that shows signs of smearing and ghosting if an LCD can't keep apace with a careening hot rod; *Quake 4,* a test of both fast-action pixel response and (in certain scenes) a screen's ability to reproduce detail in dark environments; and finally, a high-definition video trailer for *Terminator 2,* for its combination of unusually dense video information and fast-paced action.

THE RESULTS

The 4ms spec might have special appeal to power users, but these LCDs aren't the premiere 19-inch offering of either vendor. The Viewsonic and Samsung screens are housed in no-frills cabinets that allow you to tilt the screen forward or back to a slight degree, but not raise, rotate, or turn the screen in the least. Philips' LCD lets you do all that.

In terms of picture adjustment, Samsung (like Philips) beats out Viewsonic by offering a full complement of controls in DVI mode, including RGB color sliders and three gamma modes. The Viewsonic lets you adjust just brightness and contrast.

WINNER

SAMSUNG 940BF

YARDAGE
Strong all-around performer.

GARBAGE
Poor ergonomics.

What's more, Samsung goes toe-to-toe with Philips' outstanding 1905P in *DisplayMate* performance, while the Viewsonic LCD has backlight seepage around the perimeter of the screen, a so-so black level, and less-than-perfect grayscale reproduction.

Regarding games, we were skeptical we'd see a performance difference between the 4ms screens and Philips' 16ms offering. In our testing for the August LCD roundup, we found the Philips "perfectly acceptable" in *Need for Speed Underground 2.* And acceptable it may be—but next to the 4ms jobbies, the Philips displayed noticeably softer lines in the background details, particularly vertical lines, as our racecar went zooming by. A performance difference was even more apparent in *Quake 4.* This surprised us, because movement in the first-person shooter isn't especially fast, but perhaps because of the game's high-res textures and extreme detail, the Philips' pixel response proved lagging. When pixels can't change their color fast enough to keep up with the action, objects in the game can appear to have a faint halo and edges can blur. This is known as "ghosting," and we witnessed it on the Philips monitor, but not on the two high-speed offerings.

As for the high-definition video clips, all three LCDs handled them with equal aptitude.

THE BOTTOM LINE

In the contest between the Viewsonic and Samsung 4ms LCDs, we gotta hand it to Samsung. While both proved exceptional in the games department, Samsung's 940BF has the advantage of a deeper black level, better color reproduction, and more user controls in DVI mode.

Does this mean 4ms is the magic number? Not necessarily. As we mentioned before, until there is a standard for reporting the pixel-response spec, no number should be taken at face value, instead you have to rely on real-world testing. Furthermore, there's a lot of ground between 4ms and 16ms. If a 6ms or 8ms LCD gets you better amenities (say, a fully adjustable stand or a larger screen), along with superb gaming, why settle for less?

We're starting to see a whole new crop of LCDs from various vendors, sporting single-digit response times and an array of features. Look for reviews of these products in upcoming issues. MPC

SPECS

	SAMSUNG 940BF	VIEWSONIC VX924
SCREEN SIZE	19 INCHES	19 INCHES
NATIVE RESOLUTION	1280 X 1024	1280 X 1024
INPUTS	DVI, VGA	DVI, VGA

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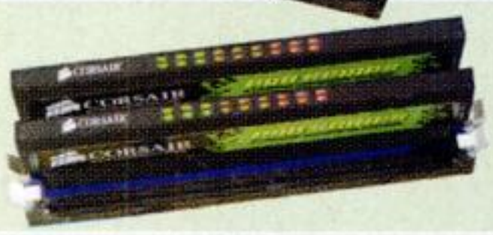

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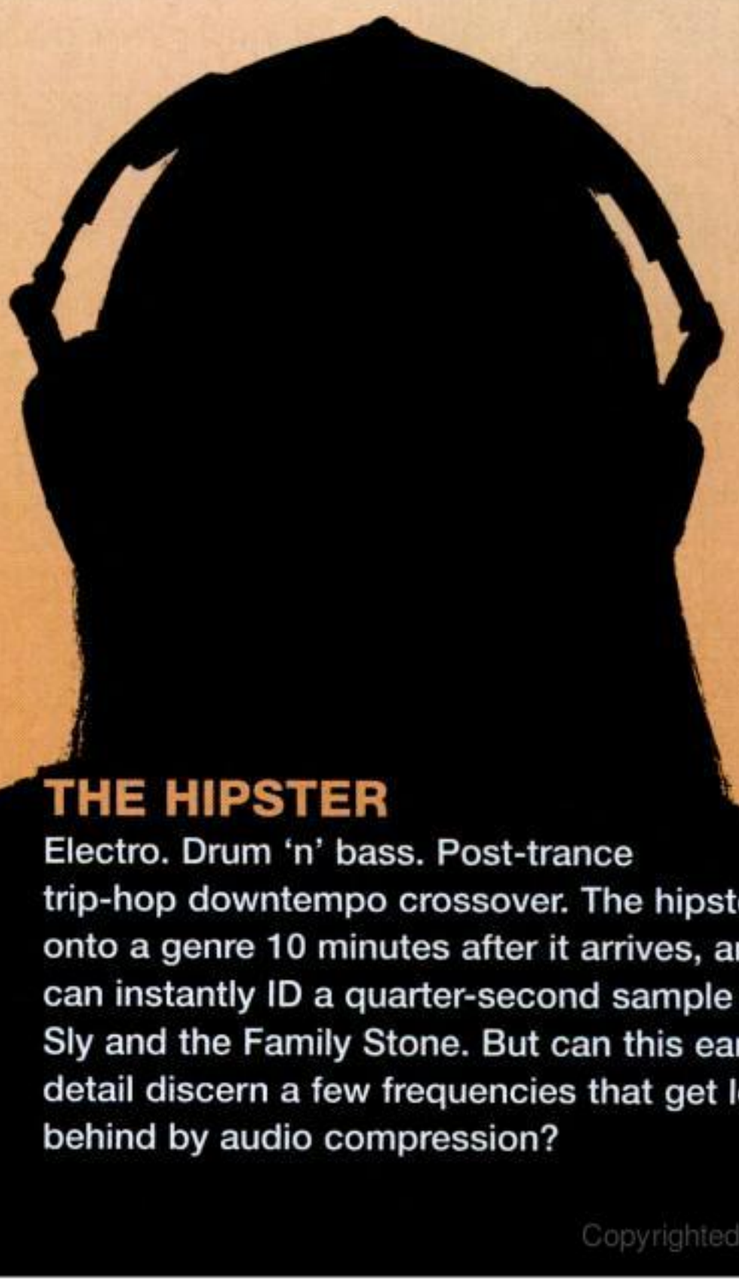
ANOTHER

MAXIMUM PC CHALLENGE

THIS MONTH: **MP3s**

DO HIGHER BIT RATES PAY OFF?

BY LOGAN **DECKER**



THE CURMUDGEON

It's not the music itself—it's the *idea* of audio compression that intrigues the curmudgeon. Can an audio file compressed one-third to one-tenth of its original size really sound as good? A cynic with an open mind and bat-like hearing, the curmudgeon reserves judgment—for now.

THE HIPSTER

Electro. Drum 'n' bass. Post-trance trip-hop downtempo crossover. The hipster's onto a genre 10 minutes after it arrives, and can instantly ID a quarter-second sample as Sly and the Family Stone. But can this ear for detail discern a few frequencies that get left behind by audio compression?

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In a tidal shift akin to the Sexual Revolution, the heyday of *Napster* (that's 1.0) markedly changed Americans' perceptions of intellectual property rights and fair use. Some folks considered the music-swapping orgy a shameful, lawless epidemic of hedonism that would inexorably lead to social and economic chaos, while others considered it a thrilling, lawless epidemic of hedonism that liberated all of us from the musty stench of an increasingly bland and commercial culture. But everyone understood one thing: MP3s were here to stay.

Back then, most MP3s were encoded at constant bit rate (CBR) 128Kb/s, striking a balance between acceptable audio quality and file sizes that were small enough for easy trading over a dialup connection. But what was born out of necessity endures today, as most of the music available on rogue peer-to-peer networks is still compressed at this rate. It's been called "near CD" quality, but we know better—it isn't even in the same Zip code as CD audio.

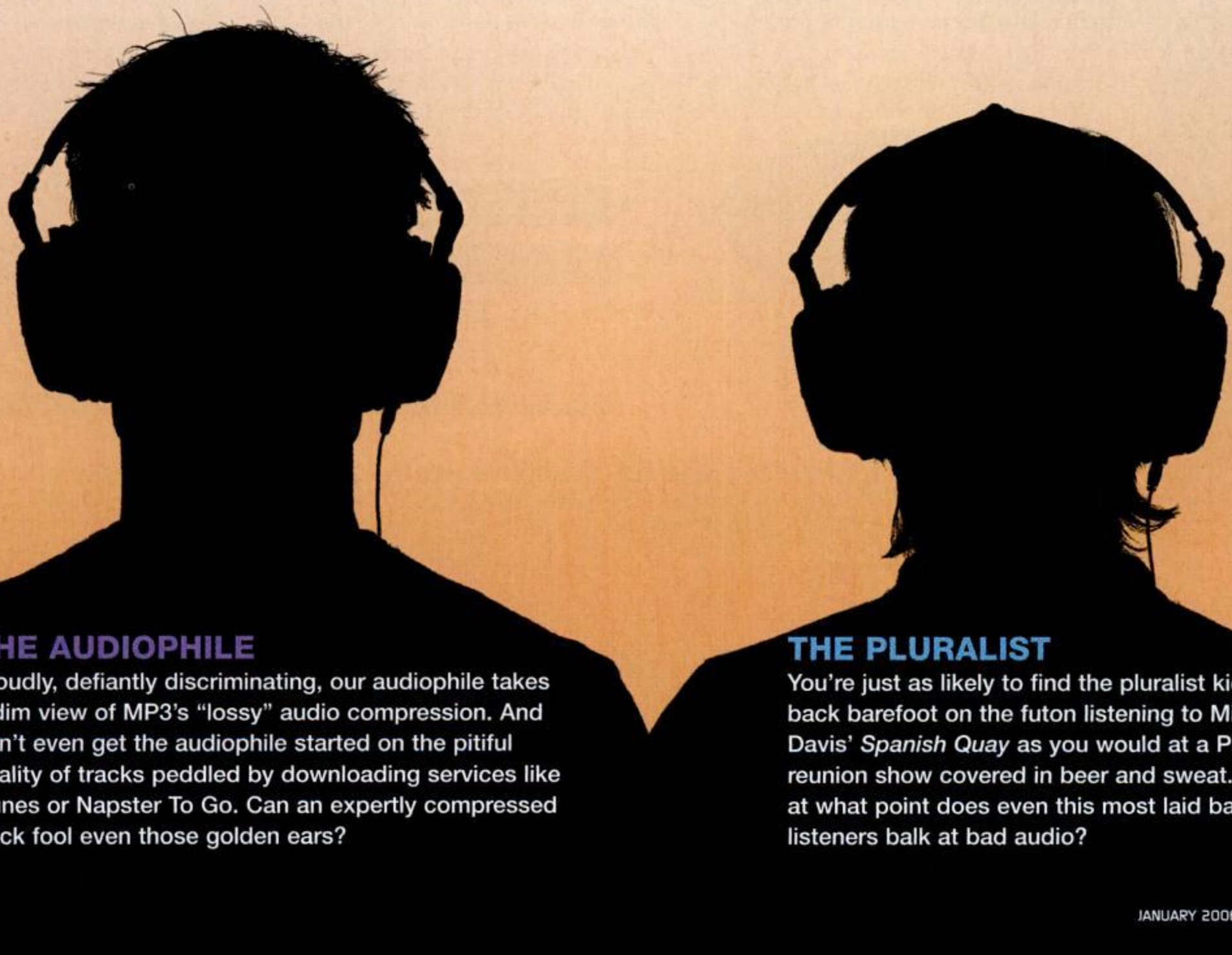
But at what point do higher bit rates stop paying off and simply take up too much space? 160Kb/s? 192Kb/s? And can a hardcore audiophile really tell the difference between a 320Kb/s track and an uncompressed one? What about a normal music listener?

These are the questions we wanted answered when we set out bear traps around the office and came back later that afternoon to retrieve the snared employees. From the bunch, we selected four representing a range of musical tastes and quality demands. We handed them headphones, pressed the play button, and got some surprising results.

HOW WE TESTED

Each lucky participant was asked to bring in a CD with a track that he or she has listened to for years and knows so intimately that a single missing hi-hat tap would stand out like a sudden blast from a tuba. We ripped each track using *iTunes* at three quality levels: 160Kb/s, 320Kb/s, and uncompressed WAV. The compressed files were ripped using variable bit rate (VBR) encoding, meaning that a 160Kb/s VBR track allows the bit rate to rise and fall depending on the complexity of the music while maintaining the selected bit rate as the minimum bit rate for the track.

In a quiet room with mood lighting and kitschy Scandinavian furnishings, the participants put on a pair of Sennheiser HD 580 headphones that were attached to our test PC's Creative X-Fi soundcard. The participants listened to not only the three versions of their own track, but also the three tracks from each of the other participants, for a total of 12 tracks in all. Each participant was allowed to listen to each track as long as he or she could stand it, and was allowed to repeat portions of the track and do A/B testing with the other tracks.



PHOTOGRAPHY BY SAMANTHA BERG

THE AUDIOPHILE

Proudly, defiantly discriminating, our audiophile takes a dim view of MP3's "lossy" audio compression. And don't even get the audiophile started on the pitiful quality of tracks peddled by downloading services like iTunes or Napster To Go. Can an expertly compressed track fool even those golden ears?

THE PLURALIST

You're just as likely to find the pluralist kicking back barefoot on the futon listening to Miles Davis' *Spanish Quay* as you would at a Pixies reunion show covered in beer and sweat. But at what point does even this most laid back of listeners balk at bad audio?

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ANOTHER
MAXIMUM PC
CHALLENGE

THE HIPSTER

The Hipster was frantic. She listened to tracks over and over again, ferreted out loud sections and asked them to be repeated and compared with the same section in another version of the track. She leaned forward several times, pressing the cups of the headphones to the sides of her head. She removed the headphones, took a breath, and put them back on. It was all for naught—"this is hard" she said, "this is really hard."

In the end, the Hipster confessed that she resorted to guessing in most cases, relying on a hunch based on instinct rather than any identifiable portion of the tracks. Her instincts proved to be accurate when listening to her own track; she correctly identified the bit rates of all three versions. As for the rest, guessing didn't pay off so well—none of the other participants' tracks were correctly identified, and she had to settle for a humbling three out of 12 correct, the lowest of the group.

In her frustration, however, she managed to deliver one zinger. While listening to a choral track provided by another participant, she told *Maximum PC*: "After listening to this song, I don't feel so bad about my track."

SCORE CARD

	PLURALIST'S TRACK	CURMUDGEON'S TRACK	HIPSTER'S TRACK	AUDIOPHILE'S TRACK
UNCOMPRESSED	X	X	✔	X
320K VBR	X	X	✔	X
160K VBR	X	X	✔	X

THE PLURALIST

The Pluralist appeared to be having too much of a good time, smiling, frisking through tracks, and tapping her fingers on the table in time with the music. She was fearless about volume level and didn't hesitate to ask us to crank it up while scrutinizing certain portions of the tracks. But she found the exercise to be anything but a breeze. "I'm pretty sure about this," she told us, but quickly added, "sort of." And then: "Wait, can I hear them again?"

Despite this last-minute waffling, she was very confident about identifying the quality levels of her own track, as well she should have been: She correctly identified all three. With songs she was not familiar with, or with tracks that made her burst out laughing (see the last sentence of the Hipster's report), she identified only two of the 160Kb/s tracks and a single 320Kb/s track. The final result—six out of 12 correct—doesn't seem particularly impressive until you consider that this was the highest score of the entire group!

SCORE CARD

	PLURALIST'S TRACK	CURMUDGEON'S TRACK	HIPSTER'S TRACK	AUDIOPHILE'S TRACK
UNCOMPRESSED	✔	X	X	X
320K VBR	✔	✔	X	X
160K VBR	✔	X	✔	✔

HOW GOOD IS YOUR ENCODER?

The thing that most often fools newbs is not knowing what kind of sounds are evidence of bad encoding or heavy-handed compression, but there are a couple tracks you can throw at your software to see how well it's doing. Of course, you should begin with uncompressed files, so you can't download these test tracks from an online service. If you don't want to pony up for the CDs, you might want to check your local library.

The first is "Neon Reprise" from *Metropol* by Lunatic Calm. The song contains a whooshing upward sweep that audio compressors have a *very* difficult time with. Turn off Joint Stereo and keep upping the bit rate if you hear any warbling (like a cassette tape that's been mangled).

The second comes from the legendary 1965 RCA Victor Opera Series recording of Verdi's *La Traviata*. In Act II, Track 10, position 3:16, Anna Moffo belts out a bone-liquefying high note. Focus your attention not on her voice, but on the instrumentation behind it. If there's any fuzz or rumbling in the background, again, dial up the bit rate.

THE CURMUDGEON

Although ostensibly objective and cool-headed, the curmudgeon was none too happy once the listening tests began. He was initially grumpy, and as the minutes flew by, he became increasingly restless and even hostile at times. He wanted to know, for example, how the test administrator knew that the files were done correctly if only the staff member who labeled the tracks knew which was which.

Nonetheless, he marched forward, and was particularly demanding of A/B testing, comparing portions of his own track with numerous repeats. Apparently, the diligence didn't pay off: The curmudgeon was unable to correctly identify the quality level of *any* of the three versions of his own track! In an eerie coincidence, however, he dissed the Hipster's track much as she dismissed his ("I thought Ani DiFranco got all her anger out already...."), yet correctly identified the quality levels of the three versions of that track. He was also able to identify a 320Kb/s version and an uncompressed version of the other track sets, but that's all, for a modest total of five out of 12 correct.

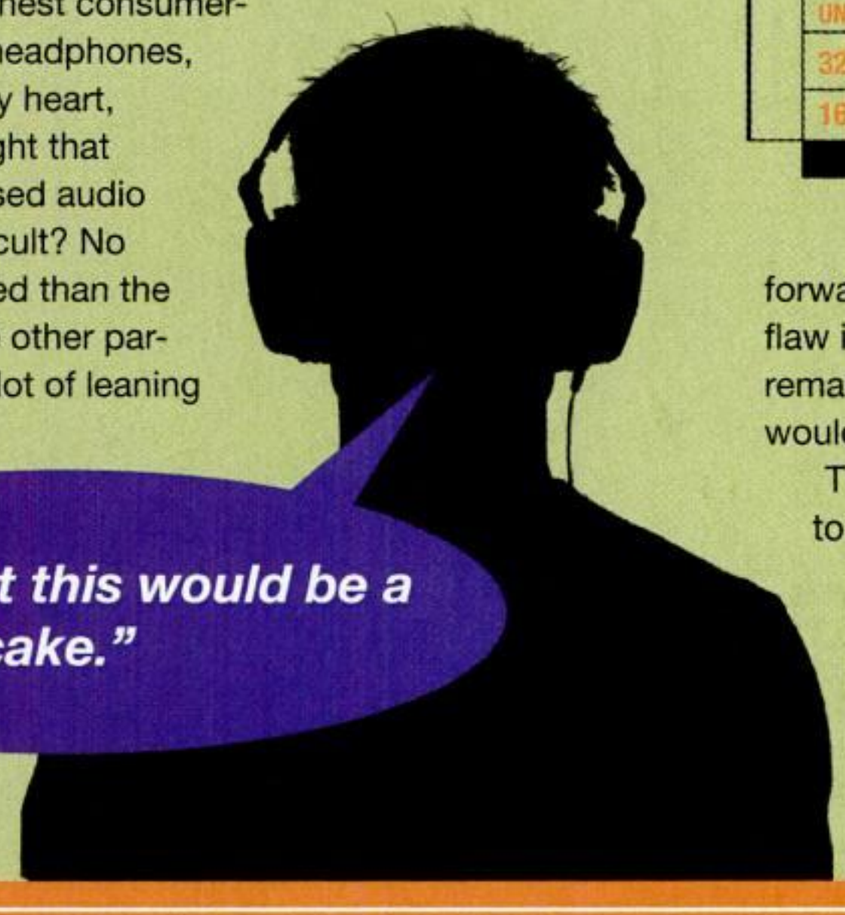
When the test results were revealed, the curmudgeon threw a hissy fit, questioning our methodology before sinking into an oppressive quiet behind his keyboard.

SCORE CARD

	PLURALIST'S TRACK	CURMUDGEON'S TRACK	HIPSTER'S TRACK	AUDIOPHILE'S TRACK
UNCOMPRESSED	✔	X	✔	X
320K VBR	X	X	✔	✔
160K VBR	X	X	✔	X

THE AUDIOPHILE

We all thought it would be a piece of cake, for that matter. With the finest consumer-level soundcard, ace headphones, and tracks we knew by heart, who would have thought that identifying a compressed audio track could be so difficult? No one was more surprised than the audiophile. Like all the other participants, there was a lot of leaning forward, as if getting closer to the PC might expose some hidden flaw in the audio stream. Near the end of the tests, the Audiophile remarked, "I specifically chose this song because I thought it would be easy [to identify the compressed version]. It wasn't."



SCORE CARD

	PLURALIST'S TRACK	CURMUDGEON'S TRACK	HIPSTER'S TRACK	AUDIOPHILE'S TRACK
UNCOMPRESSED	✔	X	X	✔
320K VBR	✔	X	✔	X
160K VBR	✔	X	X	X

That's pretty much the story told by his results—he was able to identify the uncompressed version of his own track after considerable A/B comparisons with the compressed versions, but mixed up the 320Kb/s and 160Kb/s versions. He was also able to correctly identify the quality levels of another participant's track, and the 320Kb/s version of yet another's track, but had to settle on a tie with the Curmudgeon, at five out of 12.

THE UPSHOT

With the possible exception of the USB Key that survived a washing *and* drying cycle, no other Maximum PC Challenge has ever surprised us as much as this one. It's downright humiliating, in fact, that in many cases, we were unable to tell the difference between an uncompressed track and one encoded at 160Kb/s, the bit rate most of us considered the absolute minimum acceptable for even portable players.

Some follow-up testing confirmed our suspicions: variable bit rate encoding makes a *tremendous* difference in the audio quality results, certainly enough to justify—many times over—the slight file size increase. Capping the bit rate at 160Kb/s in MP3 files can be pretty harsh on a track, but allowing the bit rate to wander upwards during more complex passages—as variable bit rate encoding does—and throttle down during quieter sections captures an astonishing amount of complexity while keeping file sizes down to an impressive minimum. MPC

THE REVOLUTION WILL BE DIGITIZED!

It's time to bid adieu to the analog camcorder. DV-cams are where the action is today. To find out what makes digital video tick, Maximum PC reviews five consumer-oriented models—and one pro-level cam that's become the darling of independent filmmakers

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There was a time when making a camcorder recommendation was simple: Divide your feature requirements into two lists labeled "must-have" and "nice-to-have." Then buy a model that delivers all of the former and as many of the latter as possible without busting your budget. These days, making a purchasing decision is a little more difficult, thanks to all the options that have resulted from improvements in technology.

Your first decision, at least, is simple: Go digital. No one should spend money on an analog camcorder. After that, your choices become much more complicated. There's a bewildering array of models, each with different features, capabilities, and price tags. In fact, shoppers can choose from 18 different consumer DV cams from Sony alone.

And tape—such as MiniDV—is no longer the only digital recording medium: Of the six models reviewed here, for example, one can write directly to either 3-inch DVD-Recordable or DVD-RAM discs, one is based on flash memory, one features an integrated hard drive, and three use MiniDV tape.

Manufacturers certainly don't seem interested in making your decision any easier. Consider the often bizarre trademarks they use to identify seemingly common features: We don't mean to pick on Sony, but exactly how does its "Advanced Hole Accumulation Diode" CCD deliver better performance than other manufacturers' image sensors?

On the bright side, the huge selection of camcorders on the market means there's a model to fit everyone's requirements, and you won't have to pay a bundle for it. The intense competition helps keep prices in check. We're going to provide you with some basic knowledge about the most important DV-cam specs, conduct hands-on reviews of five mid-priced consumer DV cams, and then compare these consumer cams to one very high-end prosumer digital camcorder.

Once you understand the fundamentals and are aware of what's available in today's digital-camcorder market, you'll stand a much better chance of buying the model that's exactly right for you.

BY MICHAEL **BROWN**

PHOTOGRAPHY BY SAMANTHA BERG AND MARK MADEO

Intellectual Property Material

THE REVOLUTION WILL BE DIGITIZED!

BUYERS GUIDE

The five most important features you should consider before whipping out your plastic

TAPE-BASED MEDIA

Going digital doesn't necessarily mean ridding yourself of tape. In fact, the single most common DV-cam format, MiniDV, still relies on the stuff. Tape's drawbacks are numerous: Unlike all the other recording media we'll discuss, for example, tape is not a random-access medium. This makes it difficult to locate specific scenes without spending a lot of time fast-forwarding and rewinding. Copying a tape's contents to your PC's hard drive for editing is also a slow process. And no matter how many spare cassettes you carry, you'll always run out at the most inopportune moment.

On the upside, tape delivers the highest quality because the video undergoes the least amount of compression during capture. Perhaps contra-intuitively, tape offers the easiest method of importing video into a PC-based editing package. The cassettes are cost-effective, too: Expect to pay about $15 for a two-pack, with each capable of recording up to 60 minutes of material.

IMAGE SENSOR

A DV cam's image sensor—typically a charge-coupled device (CCD)—absorbs light entering the camera through its lens and converts it into electrical charges. The larger the CCD, the more sensitive it is to light and the more capable it is of capturing image detail. Most consumer models have a single CCD, while high-end cameras boast three (one each for red, green, and blue light). We recommend an image sensor that's at least 1/3-inch across for best performance. You want one that's capable of at least 690,000-pixel (effective) video resolution and 2 megapixels of still-image resolution.

Playing your videos back on a widescreen TV? Look for models that can record in either 4:3 or 16:9 aspect ratios. And because it's unlikely you'll always be shooting outdoors in bright light, look for a DV cam with a low minimum illumination requirement (a lux, or candlepower, rating in the one to three range). The lower the number, the better the camera will perform indoors and in low-light conditions.

OTHER RECORDING MEDIA

Some DV-cams record directly to 3-inch DVDs, which cost about $6 each for DVD-RAM or $8 a piece for DVD-R. You can record up to 30 minutes of video on either. DVD-RAM can be erased and reused as many as 100 times; but the discs are less universally compatible with DVD drives and players than DVD+R and DVD-R.

There are also new DV cams that record directly to internal hard disks. Because the cameras are entirely self-contained, you don't need to carry any extra tapes or accessories. A 30GB drive can hold about seven hours of DVD-quality video in MPEG-2 format. Of course, when the drive is full, you'll need to delete (or at least archive) material in order to record more.

Some DV-cams use Flash memory, which—unlike any of the previously discussed media—is nearly impervious to skipping. The downside is its extremely limited capacity. One gigabyte of flash memory is capable of recording just 22 minutes of high-quality video.

LENS QUALITY

Without a good lens, the best sensor in the world won't mean a darn. Digital zoom has improved considerably, but silicon is no substitute for quality optics: Camcorders in this price range should sport at least 10x optical zoom. Image stabilization is another important feature; here again, optical is better than electronic because the latter manipulates the image being recorded, which can result in visible aliasing in your final video.

Auto-focus technology has also improved by leaps and bounds, but some instances demand manual override, a feature that all too few DV cams sport.

PORTS AND CONNECTORS

FireWire (IEEE-1394) is the fastest means of transferring video to your PC; USB 2.0 is the next best thing. Better cameras support both. Models that can perform analog-to-digital conversion are handy: They can digitize video from a VCR or analog camcorder and transfer it to your PC in real time.

Most DV cams also function as digital still cameras, storing images to flash memory. Some models can print stills directly to a printer (with PictBridge being the most common cross-brand standard).

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Samsung SC-X105L Sports Cam

The perfect camcorder for capturing your best Jackass moments

Samsung's SC-X105L should by no means be your only digital camcorder. But if you can swing the budget for a second DV cam, this wee rubber-coated devil can't be beat for its sheer audaciousness.

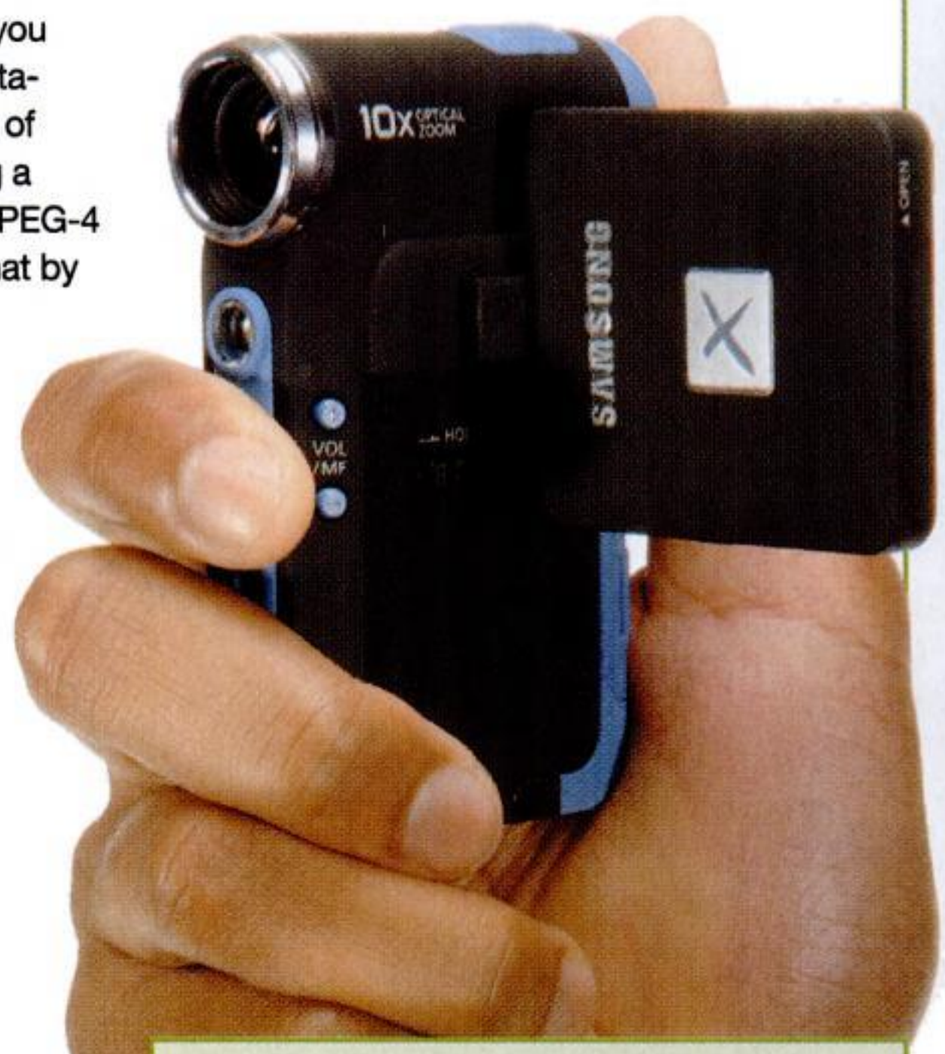
That's right. This tiny camera is encased in weather-resistant, shock-absorbing, easy-to-grip neoprene. What could be cooler than that? How about an external camera module that you can strap to your helmet or any convenient appendage before you rocket down that black-diamond slope, launch yourself into a skateboard half-pipe, or terrorize the local links in a stolen golf cart.

Unlike the other cameras in this round-up, the SC-X105L uses flash memory, so the shocks and jolts that would hopelessly scramble the video recorded to tape or disc had absolutely no impact on this one. And despite its Lilliputian dimensions—the main camera weighs only 0.32 pounds and measures just 3.65 inches tall, 2.32 inches wide, and 1.04 inches thick—Samsung managed to integrate a lens with 10x optical zoom (with auto focus and electronic image stabilization, natch) and a 2-inch swing-out LCD.

Once you get over the school-kid giddiness of recording video while tossing the SC-X105 around like a hackeysack, you begin to notice some of its many limitations. First and foremost, the 512MB of flash memory is capable of recording a total of 10 minutes, 55 seconds of MPEG-4 video (AVI format). You can double that by inserting a 1GB Memory Stick Pro; but even then, you're still talking about 20 minutes of relatively low-res video. The lithium-polymer battery, meanwhile, delivered an unexpected 48 minutes of mixed recording/playback time.

Image quality in both video and still modes was very good, considering this DV cam's svelte physique. The auto focus locked on target quickly, but we noted quite a bit of edge crawl and color bleed in close-ups. The Samsung performed poorly indoors. But let's face it: No one's going to buy this camera in the pursuit of becoming the next Quentin Tarantino; no, this camera has Jeff Tremaine written all over it.

Like the other DV-cams we looked at, the Samsung can also function as a digital still camera. The 1/6-inch CCD has only 680,000 pixels, and the external fixed-focus camera module uses an even smaller 1/4-inch CMOS sensor. PictBridge support means you can print photos directly from the camera to any printer that supports that standard. But like Ron Popeil's famed Vegomatic, the SC-X105 can also function as an MP3 player, a personal voice recorder, and a web cam—*now* how much would you pay?!



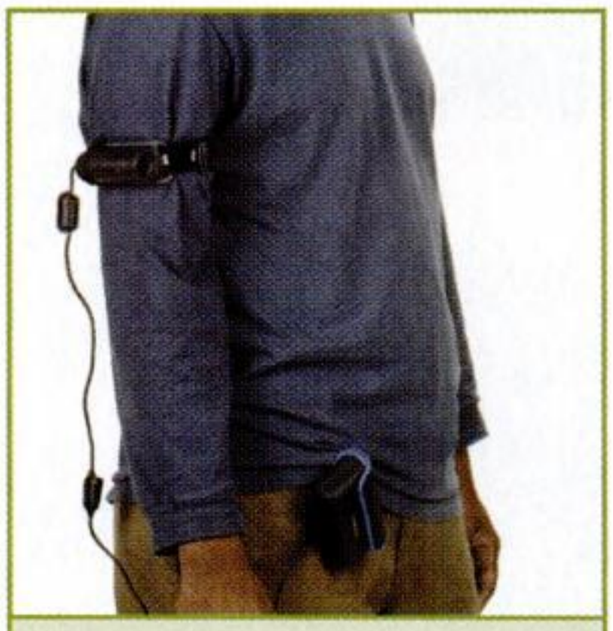
Samsung's ultra-tiny, rubber-wrapped SC-X105L Sports Camcorder is fabulous for shooting action videography—at least in short bursts. Because the camera records to flash memory, it can capture only a little more than 10 minutes of action at a time.

Unless you use Memory Stick media (and have the appropriate card reader for your PC), you'll need to rely on the USB 2.0 port in the camera's docking station to transfer video, images, and other data to and from your host PC. The absence of FireWire doesn't faze us because the files are so small anyway.

Samsung's SC-X105L is a terrifically unconventional DV cam; it's just the ticket for capturing rough-and-tumble action sequences without destroying your cam.

SPECS

RECORDING MEDIA	512MB of internal flash memory; Memory Stick Pro
LENS	Internal: F1.8 – 2.4; 10x optical zoom; electronic image stabilization; external: F2.6; fixed focus
IMAGE SENSOR	Internal: 1/6-inch CCD with 680 thousand pixels; external: 1/4-inch CMOS with 320,000 pixels
ASPECT RATIO	4:3
I/O PORTS	On camera: Multipurpose 1/8-inch jack (stereo headphone out, A/V out for TV, A/V in for remote camera); on cradle: USB 2.0, A/V out for TV
BATTERY LIFE	0:48 (hours:minutes)



Samsung's tiny SC-X105L Sports Camcorder comes with an even smaller secondary camera that you can strap to your body.

SAMSUNG SC-X105L

+ JOHNNY KNOXVILLE
Captures action while taking punishment that would destroy any other cam.

− STEVE O.
Aside from its gimmicky MP3 player/voice-recorder features, this device is a one-trick pony.

8

$700, www.samsung.com

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THE REVOLUTION WILL BE DIGITIZED!

JVC Everio GZ-MG70U

Have hard drive, will travel

When it comes to the cost of consumables, camcorders aren't nearly as bad as photo printers, but the cost of tapes and discs does add up. So the appeal of JVC's new line of DV cams that record to an integrated hard drive is obvious: There's nothing else to buy, and nothing else to carry.

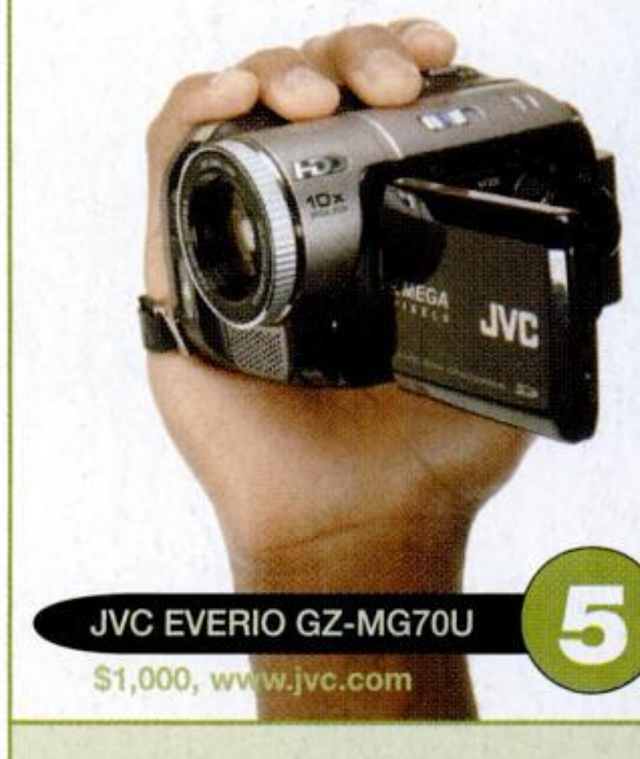
The Everio GZ-MG70U, reviewed here, packs a 1.8-inch 30GB hard drive that's capable of recording more than seven hours (430 minutes) of video at its highest resolution. You can also use the hard drive to store up to 9,999 still images at 1600x1200 resolution. In light of this DV cam's massive capacity, however, it's mystifying that JVC chose not to build in a FireWire interface—users are left to suffer with a USB 2.0 port.

But using a hard drive for storage is not without its problems: Chief among these is battery consumption (the JVC's battery conked out after just 53 minutes of continuous use). Noise is an even more troublesome issue—the unmistakable sound of the hard drive's read/write heads contaminated quiet clips.

This camera had less of a blooming problem with bright whites than Hitachi's DZ-GX20A (next page), but other colors appeared more washed out. The JVC had a difficult time producing fully saturated reds and oranges. You can disable auto focus on the camera's 10x optical-zoom lens, but using manual focus entails mashing buttons.

The Everio records in MPEG-2 format, but for some strange reason, it appends a MOD extension to the VOB files it creates. Once we changed the file extensions to VOB, we had no trouble loading segments into a variety of video-editing programs.

The built-in hard drive is innovative, but the intrusive noise it generates is annoying. And there are several features JVC neglected to include, including a viewfinder, an accessory shoe, and FireWire. Considering the price tag, we expected the GZ0MG70U to be a much better camera.



JVC EVERIO GZ-MG70U **5**

$1,000, www.jvc.com

The JVC Everio GZ-MG70U has a flip-out viewfinder, like all the other consumer camcorders we reviewed, but it can record up to seven hours of video directly to an internal 30GB hard drive.

SPECS

RECORDING MEDIA	30GB internal hard drive, SD memory card
LENS	F1.8 - 2.2; 10x optical zoom; semi-manual focus; electronic image stabilization
IMAGE SENSOR	1/3.6-inch CCD with 1.2 megapixels in movie mode; 2.0 megapixels in still-image mode
ASPECT RATIO	4:3 or 16:9
I/O PORTS	A/V out for TV, S-video out, USB 2.0
BATTERY LIFE	0:48 (hours:minutes)

Canon Optura 50

A little chunky, but packed with features

Canon's Optura 50 bears the dubious distinction of being the heaviest consumer camcorder in this roundup, weighing a portly 1.26 pounds. And although those extra ounces translate into extra features, the Optura ultimately falls well short of Kick Ass territory.

The Optura 50's 10x optical zoom lens was the only one in this roundup to feature optical, versus electronic, image stabilization. Optical image stabilization manipulates a prism to steady the image being recorded, whereas the electronic method manipulates the image itself. The difference was notable in our tests. We also appreciated the Canon's true manual focus ring, which is mounted right where it belongs: on the lens.

Place the camera in Network mode and you can use Canon's *DV Messenger* software and a USB cable to control the camcorder using your PC—even over the Internet. Sweet! This was the only camera with a viewfinder that not only extended out, but also pivoted up, much like an old 4x5 film camera. We also appreciated the abundance of buttons and dials that allowed us to print still images, choose exposure modes, control the camera's tape-transport mechanism, and perform other common tasks—all without being forced to navigate a maze of menus.

Canon managed to squeeze in every I/O port you can think of, too, including FireWire, headphone, external mic, S-video, and A/V-out. Do you have a bunch of analog tapes in your closet? Plug your old camcorder or VCR into the Canon and it will digitize the material in real time and transfer it to your PC over FireWire.

This MiniDV camera delivered video quality superior to the DVD-based Hitachi, the hard drive-equipped JVC, and the flash memory-using Samsung. But the Optura 50 just wasn't as faithful to the source as Sony's less-expensive entry. The only other flaw: During quiet passages, you can clearly hear the whirring motor driving the transport mechanism.

The Optura 50's features far outnumber its flaws, but those flaws weighed heavy on our final verdict.

CANON OPTURA 50 **8**

$700, www.canon.com

Canon's Optura 50 MiniDV camcorder had more features than any camera in its class, including a superior optical image stabilizer and a viewfinder that pivots up as well as slides out.

SPECS

RECORDING MEDIA	MiniDV tape, SD memory card
LENS	F1.8 – 2.8; 10x optical zoom; manual focus ring; optical image stabilization
IMAGE SENSOR	1/3.4-inch CCD with 1.23 megapixels in movie mode; 2.0 megapixels in still-image mode
ASPECT RATIO	4:3 or 16:9
I/O PORTS	Multipurpose 1/8-inch jack (stereo headphone out, A/V out for TV), S-video out, 1/8-inc mic input, FireWire, USB 2.0
BATTERY LIFE	1:43 (hours:minutes)

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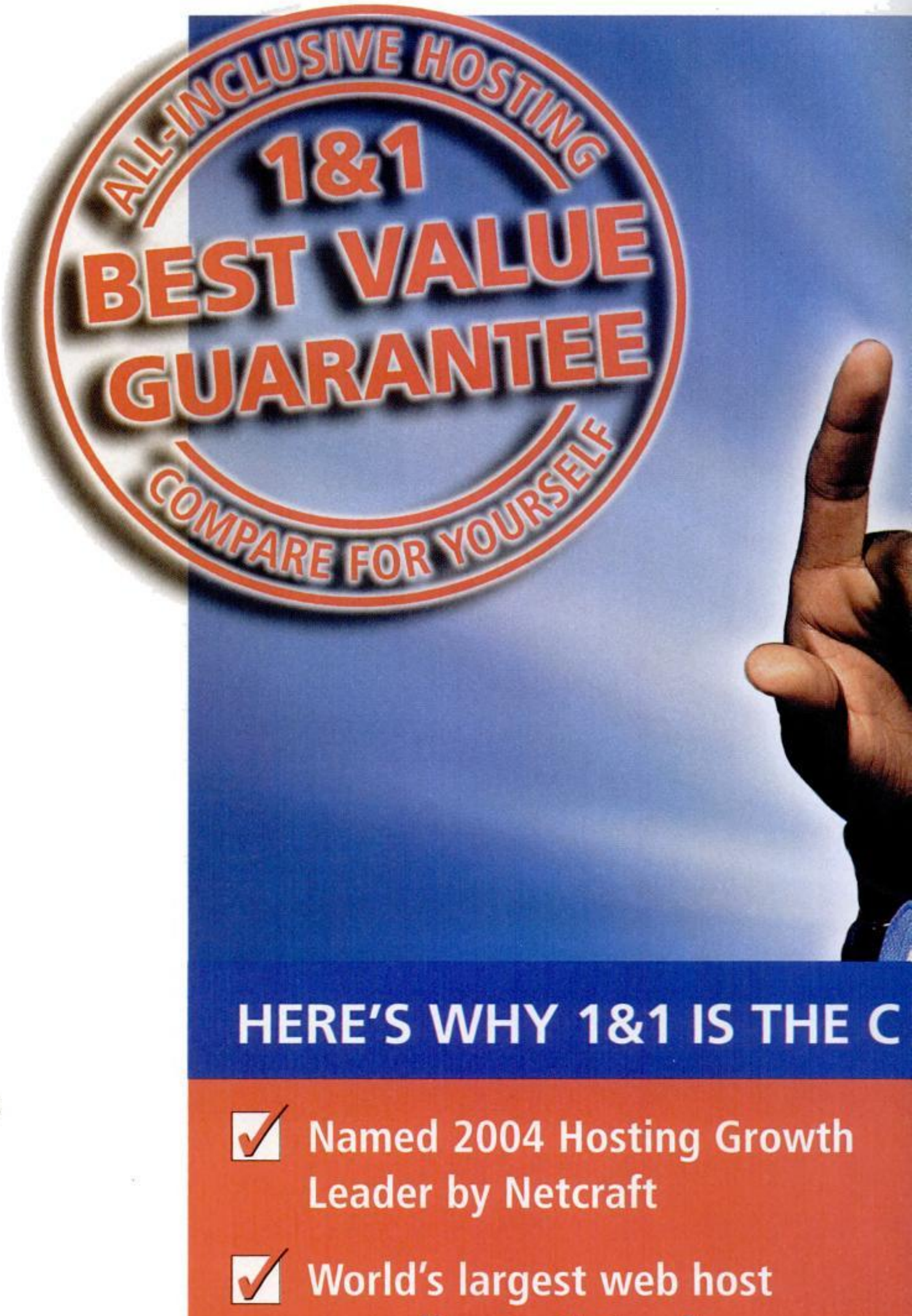

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When it comes to domain registration, no one has a better offer than 1&1. Compare for yourself!

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	1&1	Go Daddy	Yahoo!
.com|.net|.org	$5.99	$6.95 (.com) $8.95 (.net|.org)	$9.95
ICANN Fee	Included	$0.25	Included
E-mail Account	FREE 1,000 MB Mailbox Size	FREE 25 MB Mailbox Size	NO Mailbox Included
Total Annual Cost	$5.99	from $7.20	$9.95

VALUE

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FREE WITH EVERY 1&1 DOMAIN ACCOUNT:

- ✓ **STARTER WEB PAGE** Choose your template and create a mini website in minutes!
- ✓ **SEARCH ENGINE TOOLS** Easily get your site listed on the leading search engines.
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UP TO 5
FREE
DOMAINS
WITH 1&1 HOSTING!

DO YOU NEED HOSTING TOO?

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.com|.net|.org|.info	Up to 5 FREE!	$3.99	1 Free!
ICANN Fee	Included	$0.25	Included

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When you sign up for any shared hosting plan from 1&1, up to 5 FREE domains are included! These domains are free for as long as you keep your shared hosting package with us and you can use your included domains however you'd like – register new domains or transfer existing ones to 1&1.

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	1&1 BEGINNER	Go Daddy ECONOMY
Price per month	$2.99	$3.95
Included Domains	1	0
Web Space	5,000 MB	5,000 MB
Monthly Transfer Volume	250 GB	250 GB
E-mail Accounts	500 IMAP or POP3	500 POP3
Mailbox Size	2,000 MB	10 MB
Website Builder	8 pages	Extra charge applies
Photo Gallery	✓	–
Database	10 MySQL (Linux)	10 MySQL (Linux)
Search Engine Tools	✓	Extra charge applies
PHP Support (Linux)	✓	✓
90-day Money Back Guarantee	✓	–
Support	24/7 Toll-free Phone, E-mail	24/7 Phone, E-mail

Plus $3.99 per year with non-domain purchase from Go Daddy

Plus $4.95 per month for a 5-page site with Go Daddy

You'll pay from $29.95 per year additional with Go Daddy

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The 1&1 Home Package offers an exceptional value for your money. Showcase your family, hobbies or anything else you'd like to share with the world.

1&1 FEATURE SPOTLIGHT:

FREE Software Productivity Suite
A $600 value!

1&1's Software Productivity Suite gives you everything you need to create, publish, promote and optimize a successful online presence. The exclusive bundle features NetObjects Fusion 8, PhotoImpact 10 SE, search engine placement tools and many more tools for maximizing your website.

$6.99 shipping & processing fee applies.

1&1 Photo Gallery
Create an online photo album!

Add an online photo album to your website, quickly and with no programming skills! Choose from several eye-catching styles, select your favorite color scheme and layout, then import and organize your photos. Create slideshows with fade-in/fade-out transitions, background music and other professional effects.

1&1 WebStatistics
Analyze your website's performance!

Easy-to-use menus let you track visits, hits, referring websites, error pages and much more for a detailed analysis of how your website is performing. Display the information in the format you choose – pie charts, bar graphs or simple numeric output – and use the data to maximize the success of your website.

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NAL WEBSITE

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1&1 BEST VALUE GUARANTEE
COMPARE FOR YOURSELF

FREE DOMAINS INCLUDED

	1&1 HOME	YAHOO! STARTER	Go Daddy DELUXE
Price per month	$4.99	$11.95	$9.95
Included Domains	2	1	0
Web Space	10,000 MB	5,000 MB	10,000 MB
Monthly Transfer Volume	500 GB	200 GB	500 GB
E-mail Accounts	1,000 IMAP or POP3	200 POP3	1,000 POP3
Mailbox Size	2,000 MB	2,000 MB	10 MB
Website Builder	12 pages	✓	Extra charge applies
Photo Gallery	✓	✓	✓
Dynamic Web Content	✓	✓	–
Web Statistics	✓	✓	✓
Chat Channels	✓	–	✓
Database	25 MySQL (Linux)	MySQL support	25 MySQL (Linux)
Search Engine Tools	✓	Extra charge applies	Extra charge applies
PHP Support (Linux)	✓	✓	✓
Perl Support (Linux)	✓	✓	✓
Software suite ($600 value)	✓	–	–
90-day Money Back Guarantee	✓	–	–
Support	24/7 Toll-free Phone, E-mail	24/7 Toll-free Phone, E-mail	24/7 Phone, E-mail

Plus $3.99 per year with non-domain purchase from Go Daddy

Plus $8.95 per month for a 10-page site with Go Daddy

You'll pay from $29.95 per year additional with Go Daddy

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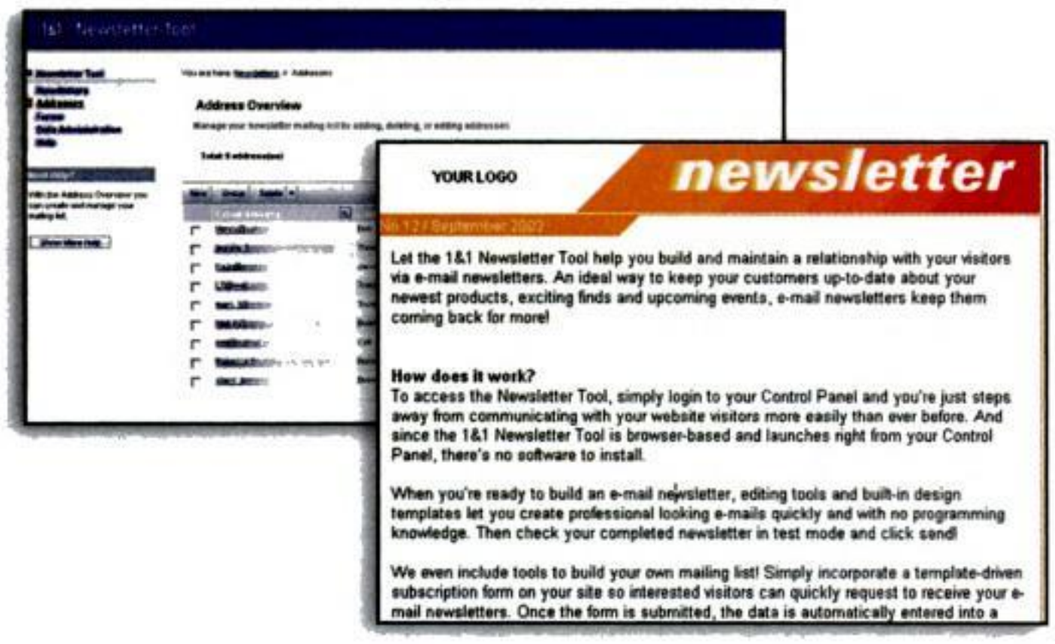
Address Overview
YOUR LOGO
newsletter
Let the 1&1 Newsletter Tool help you build and maintain a relationship with your visitors via e-mail newsletters. An ideal way to keep your customers up-to-date about your newest products, exciting finds and upcoming events, e-mail newsletters keep them coming back for more!
How does it work?
To access the Newsletter Tool, simply login to your Control Panel and you're just steps away from communicating with your website visitors more easily than ever before. And since the 1&1 Newsletter Tool is browser-based and launches right from your Control Panel, there's no software to install.
When you're ready to build an e-mail newsletter, editing tools and built-in design templates let you create professional looking e-mails quickly and with no programming knowledge. Then check your completed newsletter in test mode and click send!
We even include tools to build your own mailing list! Simply incorporate a template-driven subscription form on your site so interested visitors can quickly request to receive your e-mail newsletters. Once the form is submitted, the data is automatically entered into a

No setup fee

1&1 FEATURE SPOTLIGHT:

1&1 Dynamic Content Catalog

Add real-time web content!

Enrich your site with real-time news and fresh web content from a wide range of topics such as news headlines, business reports, sports highlights, travel destinations, online games, weather forecasts and more. Integration is easy, no HTML knowledge is required, and thanks to automatic updates, your content is always current and completely maintenance-free!

1&1 Newsletter Tool

Maintain relationships via E-mail!

Create and send professional-looking E-mail newsletters, easily and with no programming hassles. Keep your customers up-to-date about your newest products and upcoming events. Build your own mailing lists, manage addresses, track results and more.

In2site Live Dialogue

Make your site truly interactive!

Chat with your visitors while they are using your website – live and in real time! This innovative type of quick and easy communication makes In2site Live Dialogue an ideal tool for sales, support and consulting professionals.

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COMPARE FOR YOURSELF

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	1&1 BUSINESS $9.99	YAHOO! STANDARD $19.95	Go Daddy PREMIUM $19.95
Price per month			
Included Domains	3	1	0
Web Space	20,000 MB	10,000 MB	20,000 MB
Monthly Transfer Volume	1,000 GB	400 GB	1,000 GB
E-mail Accounts	2,000 IMAP or POP3	500 POP3	2,000 POP3
Mailbox Size	2,000 MB	2,000 MB	10 MB
Website Builder	18 pages	✓	Extra charge applies
Photo Gallery	✓	✓	✓
Dynamic Web Content	✓	✓	–
Web Statistics	✓	✓	✓
E-mail Newsletter Tool	✓	Extra charge applies	Extra charge applies
In2site Live Dialogue	✓	–	–
Chat Channels	✓	–	✓
Form Builder	✓	✓	–
Database	50 MySQL (Linux)	MySQL support	50 MySQL (Linux)
Search Engine Tools	✓	Extra charge applies	Extra charge applies
PHP Support (Linux)	✓	✓	✓
Perl Support (Linux)	✓	✓	✓
Software suite ($600 value)	✓	–	–
90-day Money Back Guarantee	✓	–	–
Support	24/7 Toll-free Phone, E-mail	24/7 Toll-free Phone, E-mail	24/7 Phone, E-mail

Plus $3.99 per year with nondomain purchase from Go Daddy

Plus $12.95 per month for a 20-page site with Go Daddy

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You'll pay from $29.95 per year additional with Go Daddy

VALUE

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Catherine Leonard 64 Stanhope Drive, Pittsburgh, PA 15237 family@ myname.com
Carl Brown 653 Liberty Avenue, Wilmington, NC 28403 brownc2521@lycos.com
Tom Stowe 26 N. Hills Road, Chandler, AZ 85226 webunited@gmx.net
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1&1 FEATURE SPOTLIGHT:

GeoTrust Dedicated SSL Certificate

Secure your website!

This first line of defense against online intruders ensures a safe exchange of information over the Internet. The lock icon shows your site visitors that their personal data is secure. One certificate is included with all 1&1 Developer Packages.

1&1 FormBuilder

Create feedback forms – easily!

Generate leads and gain valuable feedback with template-driven contact forms, online polls, event registrations and more. Adapt the templates to fit your site or easily build your own forms. The information entered is saved in its own database so you can view the results at any time.

1&1 WebDatabase

Easily organize large amounts of data!

It's never been easier to gather, organize and display large amounts of information. Simply select a template in the database building kit, define the individual fields you'd like to include, create a search or entry form that easily integrates into your website and more.

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1&1 – THE BEST DEVELOPER PACKAGES

FREE DOMAINS INCLUDED

ALL-INCLUSIVE HOSTING 1&1 BEST VALUE GUARANTEE COMPARE FOR YOURSELF

	1&1 DEVELOPER	YAHOO! PROFESSIONAL
Price per month	$19.99	$39.95
Included Domains	5	1
Web Space	30,000 MB	20,000 MB
Monthly Transfer Volume	1,500 GB	500 GB
E-mail Accounts	3,000 IMAP or POP3	1,000 POP3
Mailbox Size	2,000 MB	2,000 MB
Website Builder	25 pages	✓
Photo Gallery	✓	✓
Dynamic Web Content	✓	✓
Web Statistics	✓	✓
E-mail Newsletter Tool	✓	Extra charge applies
In2site Live Dialogue	✓	–
Chat Channels	✓	–
Form Builder	✓	✓
Database	100 MySQL (Linux)	MySQL support
Search Engine Tools	✓	Extra charge applies
PHP Support (Linux)	✓	✓
Perl Support (Linux)	✓	✓
Dedicated SSL Certificate	✓	–
Software suite ($600 value)	✓	–
90-day Money Back Guarantee	✓	–
Support	24/7 Toll-free Phone, E-mail	24/7 Toll-free Phone, E-mail

Add $10 per month with Yahoo!

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1&1 is the only name you need to know in affordable web hosting. Our 4 million customers worldwide can tell you what makes us the world's #1 web host: VALUE.

1&1 offers all-inclusive hosting plans for every budget and every need, with no hidden fees and no gimmicks. The bottom line? Look to 1&1 for powerful, reliable web products at consistently low prices.

Andreas Gauger, Chairman of the Board

1&1 – THE #1 WEB H

Not many Internet companies can say they've been in business for nearly 15 years. Thanks to solid products, reliable services and a commitment to providing the most feature-rich web hosting packages at some of the most competitive prices available, 1&1 Internet has steadily developed into the world's biggest and best web host.

From home offices to corporate centers, 1&1's name has become synonymous with quality.

1&1 began offering its accessible and affordable hosting packages to a small – but loyal – European customer base nearly 10 years ago. The company's reputation for reliability, integrity and value allowed it to quickly expand throughout Europe, the U.K., and the U.S.

Today some 4 million people around the world rely on 1&1 for web hosting, domain registration and various other services.

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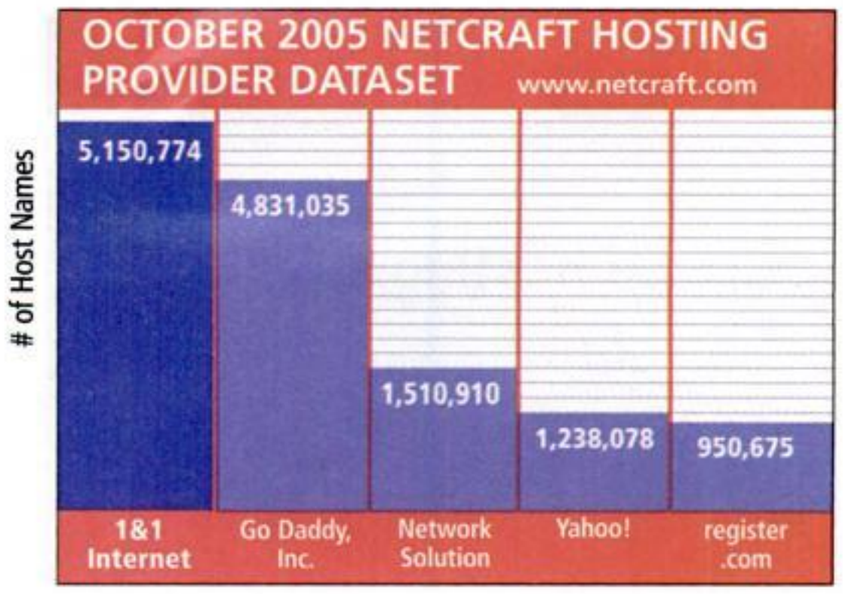
WORLD'S OST



1&1 is the World's largest Web Host.

Here is how 1&1 stacks up against the competition.

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In fact, you can even find 1&1 on the high seas as the main sponsor of United Internet Team Germany, a contender for the coveted America's Cup yachting trophy.

Thanks to its size, strength and longstanding reputation for quality and dependability, 1&1 is more focused than ever on offering the absolute best value for your money. While the company has evolved into a major player in the global web hosting market, it remains even more committed to the basic principles that have contributed so much to its success: great products at low prices, with none of the too-good-to-be-true pricing gimmicks or small print "catches" you'll find elsewhere. As we move forward, we believe this ongoing commitment to helping customers succeed will bring us further growth and, subsequently, the ability to provide customers with a whole new dimension of online possibilities.

24/7 Free Express Support for total peace of mind

High-tech Data Center with more than 28,000 servers

90-day Money Back Guarantee

Visual Studio Magazine READERS CHOICE 2005 Award

AUGUST 2005 TOP 15 WEB HOST AWARDS DEDICATED SERVER HostReview

#1 Budget Hosting WEB HOST DIRECTORY AWARD WINNER

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1&1 HAS EVEN MORE TO OFFER

In addition to shared hosting, 1&1 also offers some of the most affordable and feature-rich E-mail solutions, e-commerce hosting and dedicated servers.

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POWERFUL E-MAIL FOR YOUR HOME OR BUSINESS

1&1 Instant Mail is ideal for private users and allows you to send and receive personalized mail using your own domain name. 1&1 Microsoft Exchange Hosting gives you or your entire business reliable, affordable, up-to-date access to your critical information – any time, anywhere.

- ✓ Anytime web access
- ✓ Virus & Spam protection
- ✓ Powerful online communications

1&1 INSTANT MAIL

$0.99 PER MONTH

No setup fee

1&1 EXCHANGE HOSTING

$6.99 PER MONTH

No setup fee

1&1 eSHOPS

EASY, YET SOPHISTICATED E-COMMERCE SOLUTIONS

1&1 eShops are as powerful as any major online retailer, but with no software or hardware to install and no programming skills needed. Let the online wizard help you get started! Choose your design template then add your personal touches to achieve the exact look you want.

- ✓ More than 30 design templates
- ✓ Web space, bandwidth and E-mail included
- ✓ Powerful marketing tools included

FROM $9.99 PER MONTH

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1&1 DEDICATED SERVERS

POWERFUL SOLUTIONS FOR MAXIMUM PERFORMANCE

Take your web presence to the next level! 1&1 Root Servers and 1&1 Windows Server 2003 put you in the driver's seat with total control. Or sign up for a 1&1 Managed Server and let 1&1 handle all the server maintenance and administration.

- ✓ Includes one GeoTrust Dedicated SSL Certificate
- ✓ Advanced security for your data
- ✓ 24/7 hardware monitoring

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Hitachi DZ-GX20A

Is recording directly to a DVD all that it's cracked up to be?

There's an undeniable appeal to recording directly to DVD discs. Unlike tape, DVD offers random access, and you can take a DVD-R disc right out of the camera and drop it into your PC or DVD player. Hitachi's DZ-GX20A can also use DVD-RAM discs, which are more problematic from a compatibility standpoint. Plus, optical drives that support the DVD-RAM format are cheap and plentiful.

The biggest limitation to mini-optical media is recording time: Each disc can record a maximum of 18 minutes at the highest quality setting (30 minutes in Fine mode and 60 in Standard mode). And not all video-editing programs are compatible with the DVD-VR file format that Hitachi uses. This is a minor problem because the company bundles a simple DVD editing program, *DVD-MovieAlbumSE*, that you can use to re-encode your footage. It still adds an extra step, however, if you'd prefer to use a more fully featured program such as Microsoft's *Movie Maker*.

The DZ-GX20A is equipped with a good-size 1/3.6-inch CCD that delivers 1.2 megapixels for video and 1.92 megapixels for still images. This DV-cam performs very well in low light—its Low Light mode requires just 0.3 lux. You can switch between 4:3 and 16:9 aspect ratios, but don't mistake this widescreen feature for high definition—you won't find that in any camcorder in the DZ-GX20A's price range.

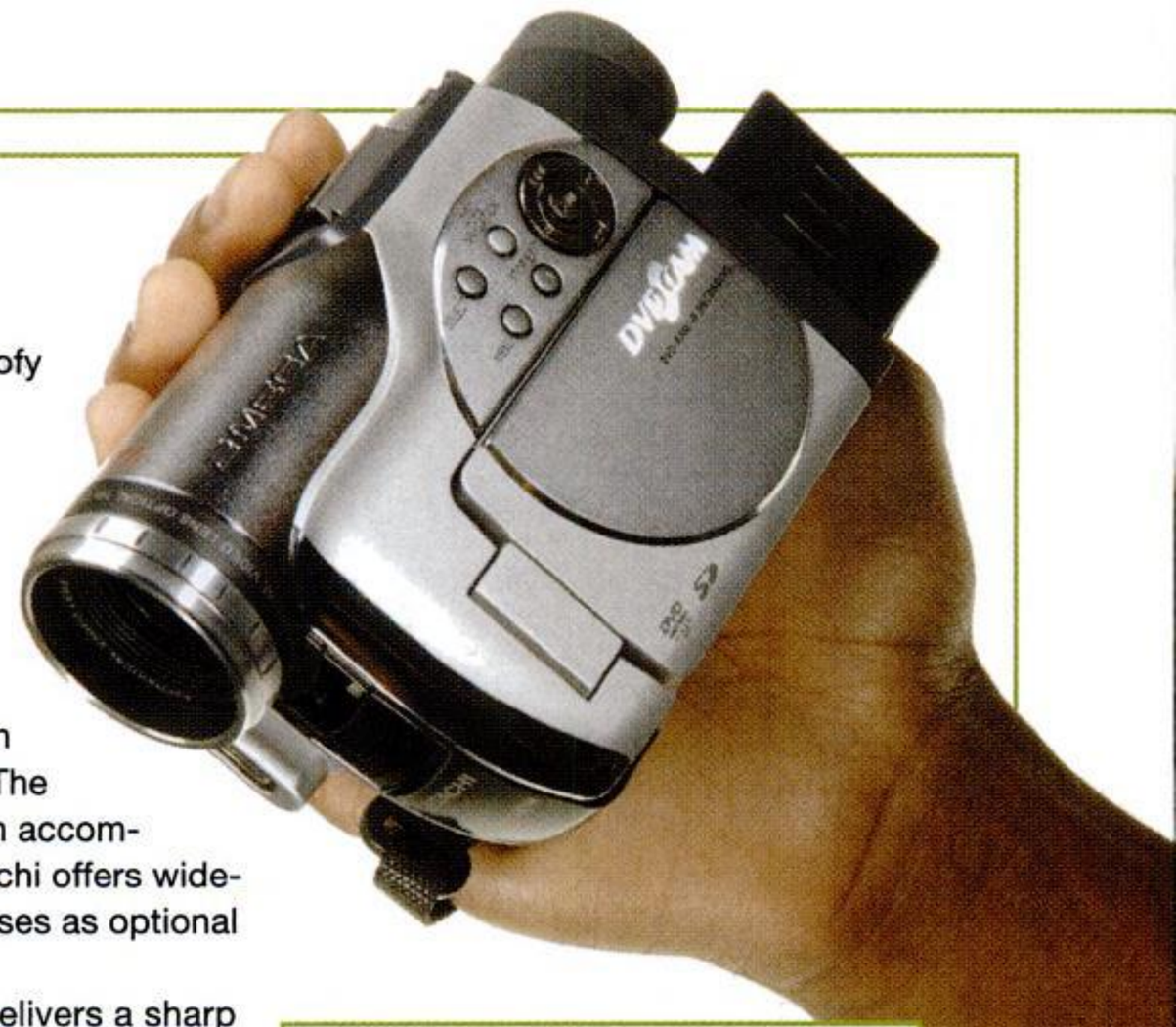
The lens offers 10x optical zoom with an effective image-stabilization feature and a responsive auto focus, but Hitachi's idea of manual focus is a goofy touch-sensitive button on the side of the camcorder. We found it impossible to manually adjust the focus without jiggling the camera. Manual focus belongs in a ring around the lens. The threaded lens barrel can accommodate filters, and Hitachi offers wide-angle and telephoto lenses as optional accessories.

The 2.5-inch LCD delivers a sharp picture, but you can't rely on it to discern critical details. The 0.2-inch color viewfinder is even less useful. We captured good-quality video with the DZ-GX20A set to its lowest compression setting, but the comparably priced MiniDV models we tested delivered better image detail and color saturation. Very light-colored objects tended to bloom and lose definition in bright light with the Hitachi, and there were noticeable motion artifacts and edge crawl.

The camera can record still images at up to 1600x1200 resolution to either disc or an SD flash-memory card inserted in the bottom of the camera. There's a built-in flash for low-light conditions, but red-eye mode is curiously lacking. Image quality was above average—for a camcorder. If you're serious about photography, however, you'll want a dedicated digital camera.

You can transfer video and photos to your PC via a front-mounted USB 2.0 port, but the camera is sorely lacking FireWire—a particularly painful shortcoming if your DVD drive doesn't support DVD-RAM. There's no support for sending images directly to a printer, either. And while you can dub still images from a video camera, camcorder, or VCR onto the memory card or directly to the DVD, Hitachi's model doesn't support the much more useful feature of real-time A/V dubbing.

Hitachi's DZ-GX20A is leagues better than previous-generation DVD cams, but we don't believe sacrificing image quality is an acceptable trade-off for the convenience of recording direct to disc.



Hitachi's DZ-GX20A can record 30 minutes of video directly to a 3-inch DVD-R or DVD-RAM disc.

Discs are not as convenient as they appear. A DVD-R must be finalized in the camera; and DVD-RAM isn't universally compatible with DVD players or even DVD disc drives.

SPECS

RECORDING MEDIA	DVD-R, DVD-RAM, SD memory card
LENS	F1.8 - 2.2; 10x optical zoom; electronic image stabilization
IMAGE SENSOR	1/3.6-inch CCD (1.23 million pixels in movie mode; 1.92 million pixels in still-image mode)
ASPECT RATIO	4:3 or 16:9
I/O PORTS	USB 2.0, 1/8-inch stereo mic-in, A/V out for TV
BATTERY LIFE	2:23 (hours:minutes)

HITACHI DZ-GX20A

+ ED WOOD (THE MOVIE)

Records directly to DVD-R and DVD-RAM; excellent battery life.

− ED WOOD (THE DIRECTOR)

Image quality is inferior to MiniDV; recording format and media are not universally compatible.

6

$1,000, www.hitachi.com

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THE REVOLUTION WILL BE DIGITIZED!

Sony DCR-HC42 MiniDV Handycam

Picture quality trumps other shortcomings

To be perfectly honest, we thought Canon's Optura 50 would beat out Sony's DCR-HC42 Handycam by virtue of the former's long list of lusty features. But Sony managed a tie the moment we played back its video.

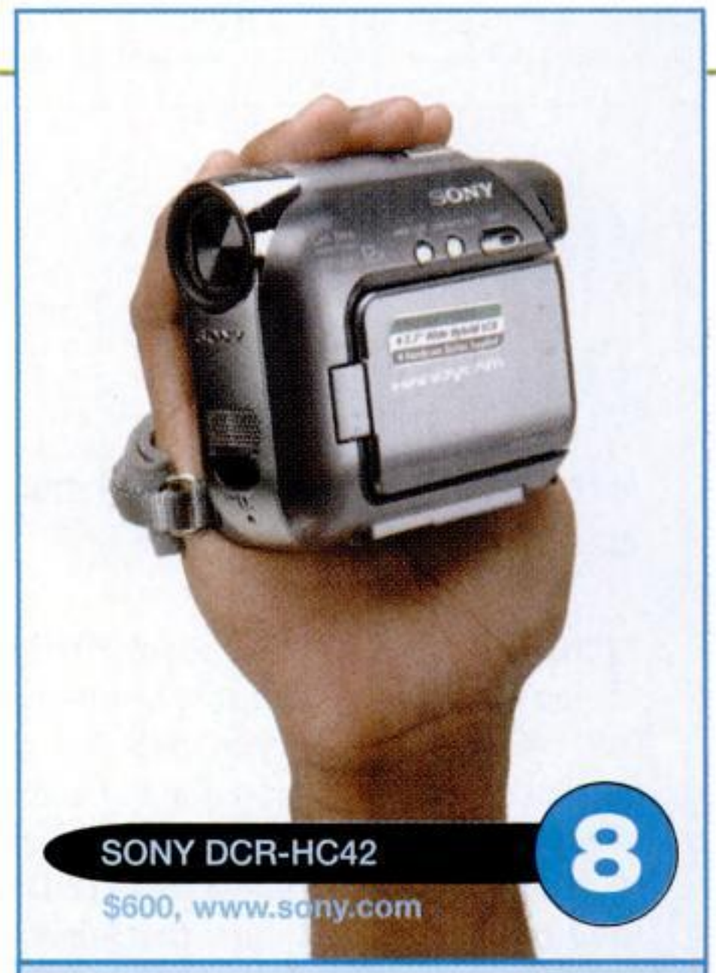
This turn of events points out the dangers of shopping by spec chart. That's not to say the HC42 is devoid of advanced features—indeed, it's endowed with a couple that we didn't find on any other cameras we tested—it's just that the Optura 50 had the most goodies on tap. The Handycam, on the other, uh, hand, delivered more faithful color reproduction than everything except the nearly 10-times more expensive Canon XL2.

Aside from the high-end XL2, each of the cameras we tested had difficulty capturing intense reds and vibrant oranges outdoors. The HC42 exhibited much less blooming with these colors and was less prone to blow out light colors in very bright light. Shooting indoors proved more problematic, likely because of this camera's smaller (1/5.5-inch) CCD. Its picture exhibited much more noise than the competition.

Like many other new camcorders, the Sony is capable of shooting in either 4:3 or 16:9 aspect ratio, but this camera has a unique flip-out LCD that's also widescreen. So where the competition must letterbox 16:9 video on their LCDs, this Handycam can utilize all of its screen real estate.

We were taken aback when we discovered that the Handycam's LCD is also a touch screen. This explains the relative paucity of buttons on the camera's body, but our infatuation with the touch screen faded the more we played with it. It was useful in some situations—such as controlling the tape-transport mechanism during replay—but quickly became annoying as we were forced to drill deeper and deeper into onscreen menus.

Among the features we found lacking on the HC42: no headphone output, no external mic input, and no USB port or analog A/V output (these are located on a separate docking station). But image quality was the most important factor in our evaluation, and this Handycam would have scored even higher had it performed better indoors.



Sony's DCR-HC42 Handycam offers several unique features, including a true widescreen flip-out LCD and a lens cap that's built into the camera. It also delivered the best image quality in this roundup.

SPECS

RECORDING MEDIA	MiniDV tape, Memory Stick Duo memory card
LENS	F1.8 – 2.5; 12x optical zoom; semi-manual focus; electronic image stabilization
IMAGE SENSOR	1/5.5-inch CCD with 690,000 pixels in movie mode; 1.0 megapixels in still-image mode
ASPECT RATIO	4:3 or 16:9
I/O PORTS	On camera: FireWire, LANC; on docking station: A/V out for TV, FireWire, USB 2.0
BATTERY LIFE	1:43 (hours:minutes)

THAT'S A WRAP!

Assessing the current state of the DV-cam market

We encountered more than a few surprises in our look at mid-price digital camcorders. We thought we'd welcome the move away from tape, but DVD and hard-disk camcorders didn't live up to our expectations. We expected that an ultra-tiny camcorder would record ultra-crappy video, but the quality of Samsung's diminutive SC-X105L was pretty good! And we thought the camera with the largest CCD would deliver the best picture quality, but it didn't—maybe there's something special about Sony's Advanced Hole Accumulation Diode CCD after all.

Some things didn't surprise us. You can't discount the speed of FireWire. Camcorder manufacturers who rely entirely on USB 2.0 shortchange consumers, especially because lots of DV editing software won't import from USB 2.0 cams. And it's much more convenient to have all your I/O options on the camera itself than to have to lug around a separate docking station.

We also didn't find a camcorder in this group that rose above an 8 verdict, much less a camera that deserved a Kick Ass award. Sure, the Canon Optura 50 is loaded with features, Sony's DCR-HC42 wowed us with its great image quality, and the tiny Samsung is a marvel of miniaturization. But none of them produced videos that justified their price.

As for still-frame photography using a DV cam, just say no. Two measly megapixels? Puh-*leeze*. That might be okay for shooting 4x6 snapshots or posting to the web, but if we really wanted to shoot pictures of that quality, we'd use our cellphones. In fact, it would be perfectly OK with us if the industry stopped trying to cram this feature into DV cams and redirected those R&D bucks toward producing better CCDs.

But lest we come off as a bunch of curmudgeonly sauerkrauts, we must admit to being impressed by the state of the art in camcorder technology. These DV cams are small, they're lightweight, and they deliver picture quality that beats the stuffing out of analog camcorders.

We predict that the alternatives to tape will improve in the coming years. The first, second, and sometimes third generations of any new technology experience growing pains, but if they manage to survive beyond that, they're likely to stick around. We also predict that it won't be long before consumer DV cams break into the territory occupied by the pro-level camcorder we examine on the next page: Canon's XL2.

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Movin' On Up!

What you get when you step up to the prosumer market

Tim Jennison, who invented the Video Toaster for the Amiga personal computer way back in 1991, deserves the lion's share of the credit for creating the desktop video market. The relatively inexpensive Video Toaster made it possible for consumers to create videos that approached professional quality; hence, the term "prosumer." This, in turn, sparked demand for inexpensive video cameras capable of doing the same.

The top prosumer camcorders today are Panasonic's DVX100a and the newer DVX200, Sony's HDV FX1, and the camera we'll take a closer look at here: Canon's XL2 ($5,000, **www.canon.com**). One factor that sets the XL2 apart from these other high-end models is its interchangeable lenses: You can remove the XL2's 20x optical zoom lens and replace it with a 3x wide-angle lens, a 16x manual-focus lens, any of the lenses designed for the previous-generation XL1, or even—with an adapter—almost any of Canon's EF still-camera lenses. And where consumer DV cams have just one CCD, prosumer models like the XL2 have three: one each for processing red, green, and blue light (the XL2's are 1/3-inch and offer a native 16:9 aspect ratio. You can also switch them to shoot in 4:3 aspect ratio.)

The ability to capture digital video in progressive-scan mode is a feature found in only a handful of prosumer DV cams, including the XL2. Most camcorders record an interlaced signal in which half of the information in a video frame is scanned each 1/60th of a second to create one field. The odd and even scan lines in two adjacent fields are then interlaced to create one coherent frame of video. The XL2 can shoot in this mode, but it's also capable of recording video at either 30 frames per second progressive-scan mode (30P), in which all the information in each video frame is captured at once, or even in a softer 24P mode to produce video that looks remarkably film-like.

It's hard to believe how good prosumer video gear has become. In recent years, films shot with digital camcorders like this have taken awards at the Sundance Film Festival and the Academy Awards. All it takes is a little bit of cash and a whole lot of talent. MPC

Notice where Canon placed the XL2's boom mic: It's up and far away from the tape-transport mechanism, so motor noise doesn't bleed into the tape. You can also replace this mic with another; the camera can supply phantom power, too. What's more, there are two XLR balanced mic inputs on the back of the camera, and you can record up to four independent audio tracks.

Prosumer cameras offer higher-quality lenses than consumer models. The Canon XL2's massive 20x optical zoom lens is coated with Flourite, to reduce lens flare, and features a highly effective optical image-stabilization system. But you can swap this lens for any of several other special-purposes lenses, or—with an adapter—any of Canon's EF-series still-camera lenses.

The viewfinder has a large rubber hood to block ambient light. Canon's decision to omit the flip-out LCD in the XL2's design is questionable, but you won't hear any criticism of the XL2's ability to record in your choice of 60 fields per second interlaced, 30 frames per second progressive scan, or a very film-like 24 fps progressive scan.

Not all prosumer cameras are as massive as the shoulder-carried Canon XL2, which tips the scales at 7.8 pounds when fully loaded. Sony's high-definition HDV-FX1 and Panasonic's DVX100a, for example, look very much like consumer DV cams.

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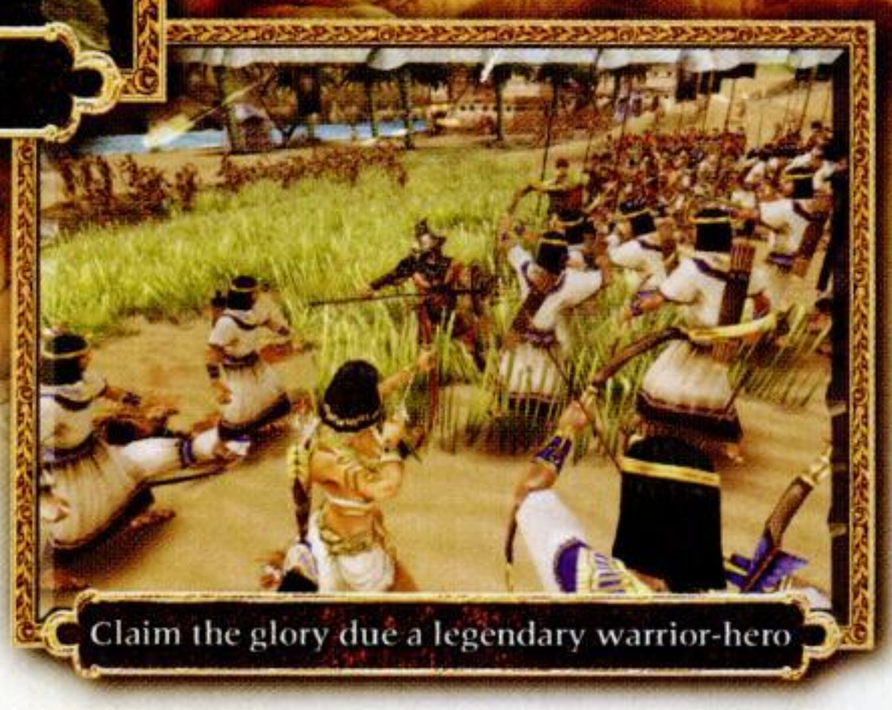
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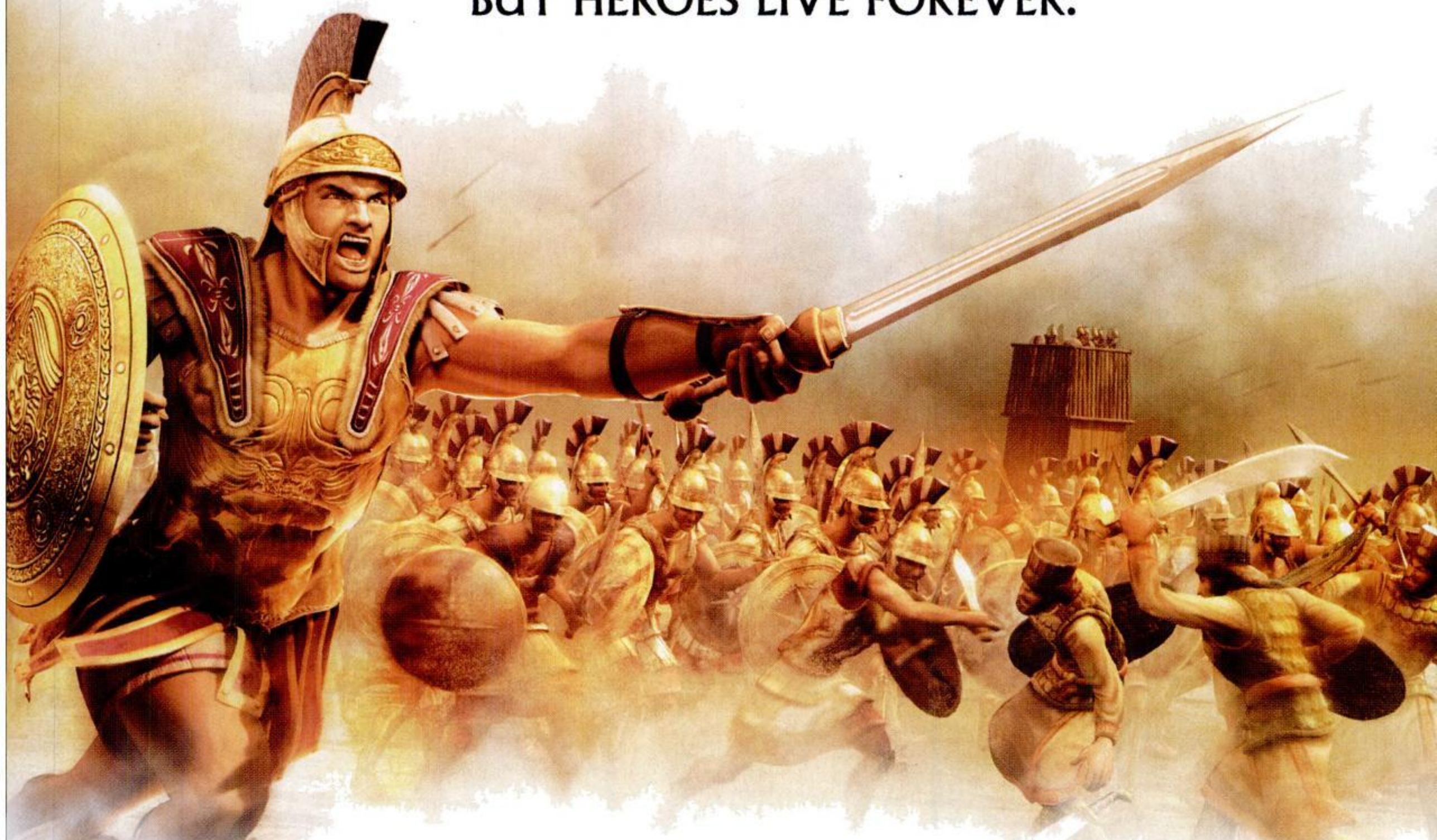

WWW.RISEANDFALLGAME.COM

TEEN T CONTENT RATED BY ESRB — Blood Violence

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BUILDING THE $300 BUDGET PC

THIS IS NO STUNT! WE BUILT A PC FOR JUST THREE BILLS. DOES IT KICK ASS? IS THIS A WORTHY MACHINE? WHAT DOES A FEW HUNDRED BUCKS BUY YOU? FIND OUT! MAXIMUM PC STAFF

Just as David Blaine spends his idle time envisioning new ways to "magically" make an ass of himself, the crew at *Maximum PC* is constantly searching for new PC-related challenges. Though our goals are typically along the lines of cramming as much horsepower as possible into an ATX enclosure, this month we decided to head in the opposite direction.

We've already built a no-holds-barred $12,000 Dream Machine, and we've plied our craft putting together a best-bang-for-the-buck $1,200 Lean Machine; the only uncharted territory left was the mysterious land of über-cheap PCs. Thus, in the name of well-roundedness, we decided to build a $300 rig that sacrifices all-out horsepower for penny-pinching real-world usability.

We knew going in that this wasn't going to be a pretty rig. Onboard video was unavoidable. And our only operating system option was Linux. Indeed, building this rig would pit the entire *Maximum PC* staff against its Kryptonite—craptacular hardware. But we faced our darkest fears in the name of knowledge.

After we got our $300 PC to POST for the first time, we raised our fists in triumph. We built the unbuildable—a $300 rig that could do anything... well, anything except play *Quake 4.* You too can build this very machine, but be warned, such a task is not for the faint of heart; it's for the faint of wallet.

TO BUY OR BUILD ON A BRUTAL BUDGET?

Naturally, this whole exercise in PC frugality could have been avoided if we just rang up Dell and shelled out $400-$500 for its cheapest PC, but where's the fun in that? We've always been ardent supporters of the "build, don't buy" ethos, and we're sticking to our guns for several reasons. First, you get to pick the exact parts you want, rather than being forced to run whatever old hardware Dell needed to unload. Second, cheap, off-the-rack PCs often contain proprietary components that will limit your upgrade possibilities—some don't even have PCI Express slots! Third, because you've built it yourself, you know the parts intimately, and know where to get BIOS and driver updates, and will have a better idea where to start when things go pear-shaped.

That said, we're not oblivious to the benefits of a prefab rig. If we were to buy a Dell, the price would probably include a 17-inch LCD, keyboard, mouse, Windows XP Home, a full warranty, and tech support. Although the latter might be a mixed blessing—for so little money, you're sure to end up at the ass-end of the telephone support queue.

PHOTOGRAPHY BY MARK MADEO

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THE PARTS

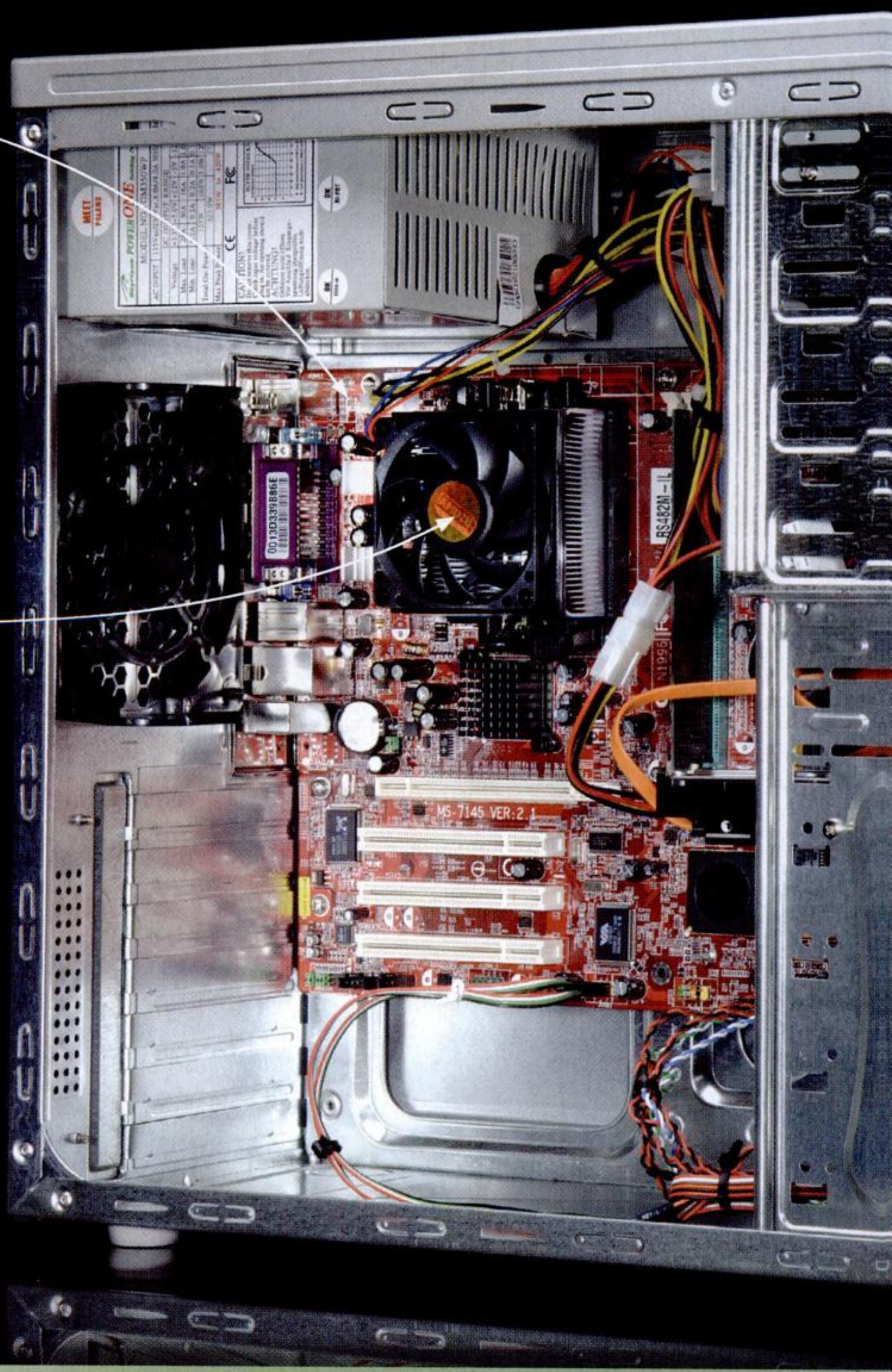
CPU	AMD Sempron 2800+	www.amd.com	$75
MOBO	MSI RS480M-IL	www.msicomputer.com	$80
MEMORY	Generic 512MB PC3200	NA	$38
HARD DRIVE	80GB Seagate Barracuda 7200.7 SATA	www.seagate.com	$45
OPTICAL DRIVE	Lite-On 16x double layer	www.liteonit.com	$42
CASE	Generic ATX case	NA	$30
OS	Ubuntu Linux	www.ubuntulinux.org	Free
GRAND TOTAL			**$310**

MOTHERBOARD: MSI RS480M-IL

MSI's RS480M-IL micro ATX board might not feature SLI or CrossFire support, but the integrated graphics in the ATI RS480 chipset are far superior to the crap graphics included with the Intel 915 chipset, which is found in most of today's budget boxes. Even better, the RS480M-IL lets us run an economical, but 64-bit capable, AMD processors on the Socket 754 interface. And should the $300 PC be drafted for gaming duties down the road, we can always upgrade the integrated Radeon 8500 graphics. Pop a brand-new, cutting-edge GPU into the PCI Express slot and this isn't a bad gaming rig! We love its upgradeability, and appreciate its native SATA support, USB 2.0, and onboard FireWire and audio. For a budget box, what more could you want?

CPU: AMD SEMPRON 2800+

Budget PC's today usually rely on a silver-haired Athlon XP or Celeron processor—castoffs from last-generation machines. For our budget box, we didn't want leftovers or dime-store bargains. Instead, we selected AMD's fairly new Sempron 2800+. Don't confuse this with the early Semprons, which were rebadged Athlon XP processors; this budget chip is based on the same core used in the Athlon 64. It has an on-die memory controller and runs in Socket 754. And because it's a 90nm Sempron, this chip even supports 64-bit OSes. It runs at 1.6GHz and has 256KB of L2 cache, but because its power consumption tops out at a mere 62 watts, it runs cool. It might be budget today, but just a few years ago, this would be top of the line.



WHAT ELSE COSTS AROUND $300?

DeLonghi EC701 Espresso Maker, www.amazon.com

One night in the cheapest room at San Francisco's Ritz-Carlton, www.ritz-carlton.com

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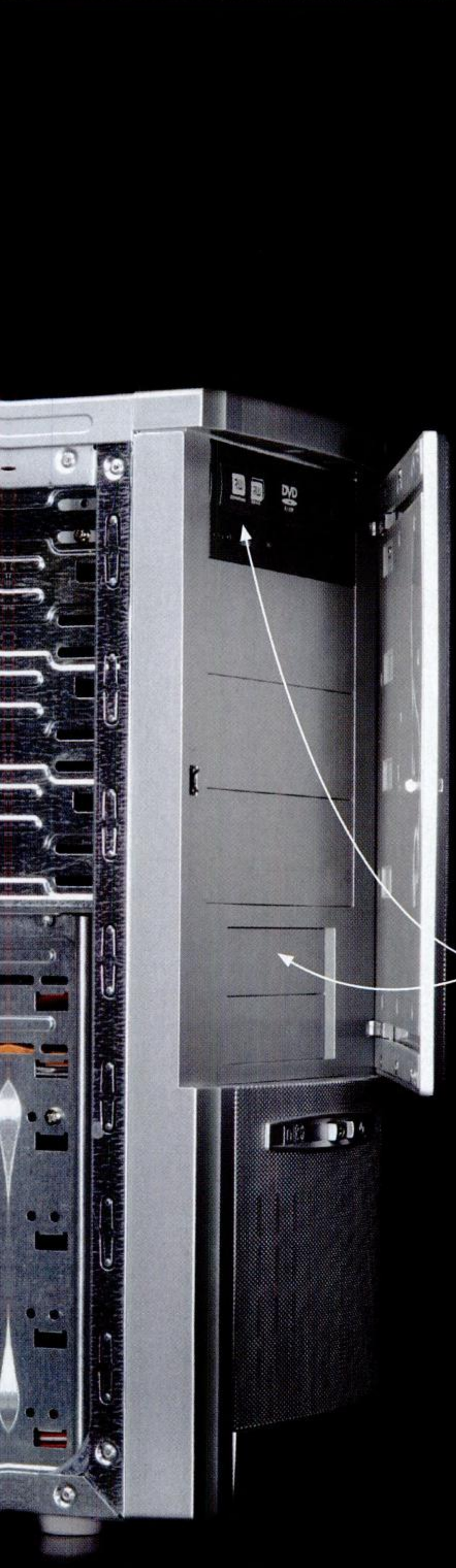

OPERATING SYSTEM: UBUNTU LINUX

There's just no way we could afford a pricey Microsoft OS and stick to our $300 budget. So we ditched Windows and installed Ubuntu, a Debian-based Linux distro suited to everyone from grandmas to power users. Ubuntu will let you do everything you need on your PC—browse the web, check email, edit photos, and edit office files. (See our How To on page 59 for full instructions on installing Ubuntu.)

There's a small incompatibility with onboard video and Ubuntu, but luckily the fix is easy: Just edit a single file before you start the GUI. The first time you boot after the install completes, press Esc during the boot process and go into the Ubuntu recovery console. From there, type: `nano /etc/X11/xorg.conf` and scroll down to the line that says Device "ATI." Replace "ATI" with "vesa", press Ctrl+o, then Ctrl+x, and restart your computer. After that you should be good to go!

THE REST: STORAGE AND CASE

Our storage demands were simple: We wanted a 16x DVD-R/RW drive and a Serial ATA hard drive with at least 60GB. Both of our prayers were answered. Though the Lite-On 16x DVD-R drive is totally generic, it gets the job done and is nearly as fast as drives costing twice as much. It even burns double-layer at 4x.

Though the Seagate 80GB SATA drive is a 7200.7 model—two generations behind the current drives—it rides the SATA 150 interface and has 8MB of cache.

We're not thrilled with the case, which we found in the back of a local PC store, looking as sad as Charlie Brown's Christmas tree, but all we needed was a steel cube with a power supply, and this enclosure fit the bill, under budget!

THE GOOD, THE BAD, AND THE STRUGGLING

Craploads of drivers, background services, and a bloated OS can bring even a top-tier rig to its knees—our $300 PC reminded us how zippy a stripped-down, lean-running rig can be. Just think of how fast your PC was the last time you had a brand-new installation of Windows—that's how this PC runs. Despite its lowly 512MB of DDR memory, it's actually quite spry, at least for the day-to-day tasks it's being used for. These tasks include basic office-productivity hijinks with *OpenOffice*, chatting while we should be working with the open-source IM client *Gaim*, checking our email in *Evolution*, and surfing the web with *Firefox*. In fact, this PC is capable of performing every single task we perform on a daily basis at our office desks (where we work like trained monkeys pounding out copy all day). It's perfect as a secondary PC in the spare bedroom, the kitchen, or for little Susie to plaster with stickers of her favorite Goth bands. Heck, the Ubuntu Linux distro is so easy to use, we could even toss this PC Mom's way and tell her to have at it. Then we'd be able to tell our friends that we're so hardcore even our moms use Linux!

Of course, this little rig has its drawbacks. Gaming is pretty much out of the question, thanks to the slow processor, watered-down video, and the paltry selection of Linux binaries for games these days. (The onboard video provided by the ATI Radeon xPress 200 chipset is a Radeon 8500, but a driver bug prevented us from running any 3D accelerated games. Fortunately, our MSI mobo has a PCI Express slot, so our PC does have an easy upgrade path to a better-supported nVidia or ATI chipset.)

Obviously with the modest CPU cache, small hard drive, and sparse memory, this isn't a video-editing machine. Nor is it a practical media server. But those are very specialized tasks, and the bottom line is that this $300 PC can perform 98 percent of the functions most non-gamers use their computers for. MPC

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Install Linux the Easy Way

Installing and using Linux on a PC used to be nigh-impossible for a neophyte. But with today's newb-friendly distros, Linux is easy for everyone

TIME 1:20 HOURS:MINUTES

Years ago, when Linux was new, installing and using the alternative OS was best left to propeller-head nerds with oodles of free time. Indeed, just getting Linux up and running on a machine required several hours, just the right mix of supported hardware, and then several more hours. If you were dealing with cutting-edge hardware, it would take a couple days of tinkering to achieve a working install with a graphical interface and a reliable Internet connection.

These days, installing Linux is a piece of cake. In addition to the traditional distros that install Linux to your hard drive, there are also several specialized distros that run directly from your optical drive, without making any permanent changes to the Windows install already on your PC. Such LiveCD distros make it really easy to give Linux a test spin and experiment without any real danger to you or your computer.

BY WILL **SMITH**

INGREDIENTS

- **BLANK CD OR DVD**
- **CD OR DVD BURNER**
- **BROADBAND CONNECTION**
- **EMPTY HARD DRIVE**
  Or a hard drive with 10GB or more of free space

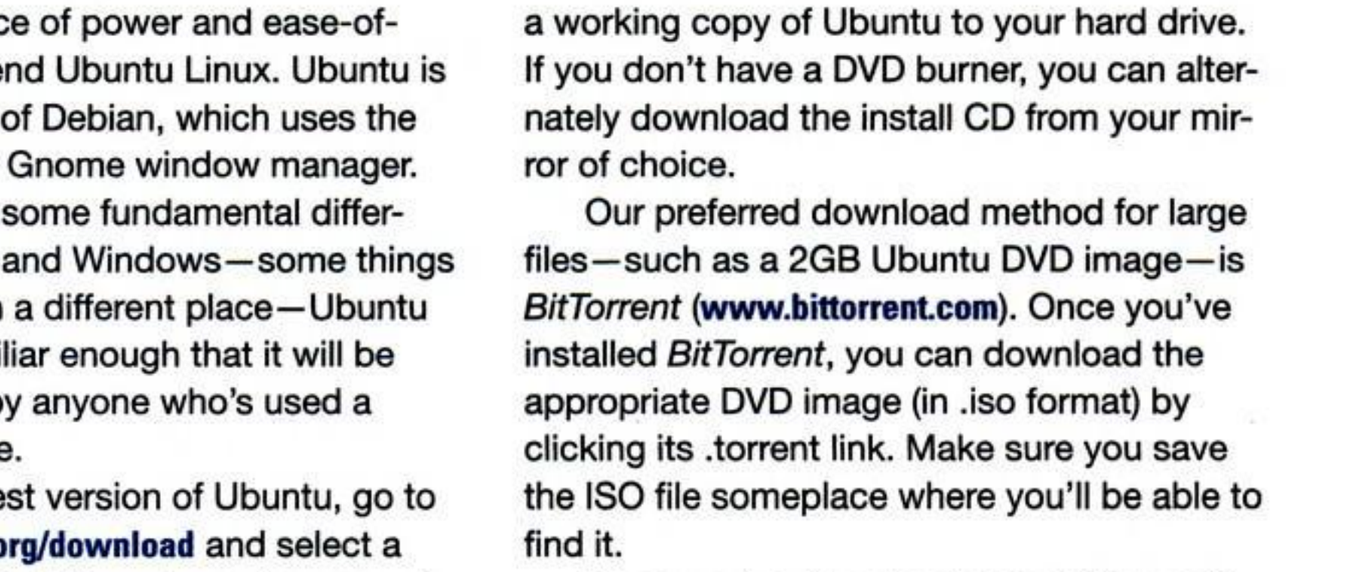
1 Downloading the Right Distro

For a great balance of power and ease-of-use, we recommend Ubuntu Linux. Ubuntu is a LiveCD version of Debian, which uses the more streamlined Gnome window manager. Though there are some fundamental differences between it and Windows—some things will naturally be in a different place—Ubuntu should seem familiar enough that it will be easily navigable by anyone who's used a Windows machine.

To get the latest version of Ubuntu, go to **www.ubuntulinux.org/download** and select a mirror near you. You'll have to make a couple of choices before you can download an Ubuntu image. You'll want either the 64-bit version—if you have an Athlon 64 or Pentium 4 that supports AMD64 extensions—or the Intel x86 version, for all other PC CPUs. If you have a DVD burner, we recommend you use the combination install/live DVD images, which allow you to test boot the OS, and then actually install a working copy of Ubuntu to your hard drive. If you don't have a DVD burner, you can alternately download the install CD from your mirror of choice.

Our preferred download method for large files—such as a 2GB Ubuntu DVD image—is *BitTorrent* (**www.bittorrent.com**). Once you've installed *BitTorrent*, you can download the appropriate DVD image (in .iso format) by clicking its .torrent link. Make sure you save the ISO file someplace where you'll be able to find it.

Once you've downloaded the ISO, you'll need to burn it to disc using your favorite CD mastering program. With *Nero,* it's as easy as double-clicking the ISO image, and clicking "Write to disc" once the app loads.



Install/live DVD

The combined install/live DVD allows you either to install Ubuntu permanently on a computer, or (by entering 'live' at the boot prompt) to try Ubuntu without changing your computer at all. There are three images available, each for a different type of computer:

PC (Intel x86) install/live DVD

For almost all PCs. This includes most machines with Intel/AMD/etc type processors and almost all computers that run Microsoft Windows. Choose this if you are at all unsure.

Mac (PowerPC) install/live DVD

For Apple Macintosh G3, G4, and G5 computers, including iBooks and PowerBooks.

64-bit PC (AMD64) install/live DVD

For computers based on the AMD64 or EM64T architecture (e.g., Athlon64, Opteron, EM64T Xeon). It is not necessary for all (even most) processors made by AMD -- only their 64 bit chips.

A full list of available files can be found below.

There are several different download options for Ubuntu, depending on your PC's CPU and your choice of download software.

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2 Prepare Your PC

Now, you should prep your rig for the actual install. We recommend installing Ubuntu on a spare hard drive—it needn't be a huge-capacity drive; an old 20GB drive will provide more than enough space. Take note of the capacity of your current drive so you won't accidentally overwrite your current Windows partition and all the data on it. (Ubuntu's installer won't overwrite your Windows partition unless you tell it to, but it's better to be safe than formatted.)

If you boot into Windows after you install your new Linux drive, you can delete the current partitions (go to Control Panel, Administrative Tools, Computer Management, and then select the Disk Management option. Right click the partitions you want to delete, and then select Delete Partition, and go through the dialogs). The Ubuntu installer will install to unpartitioned areas by default.

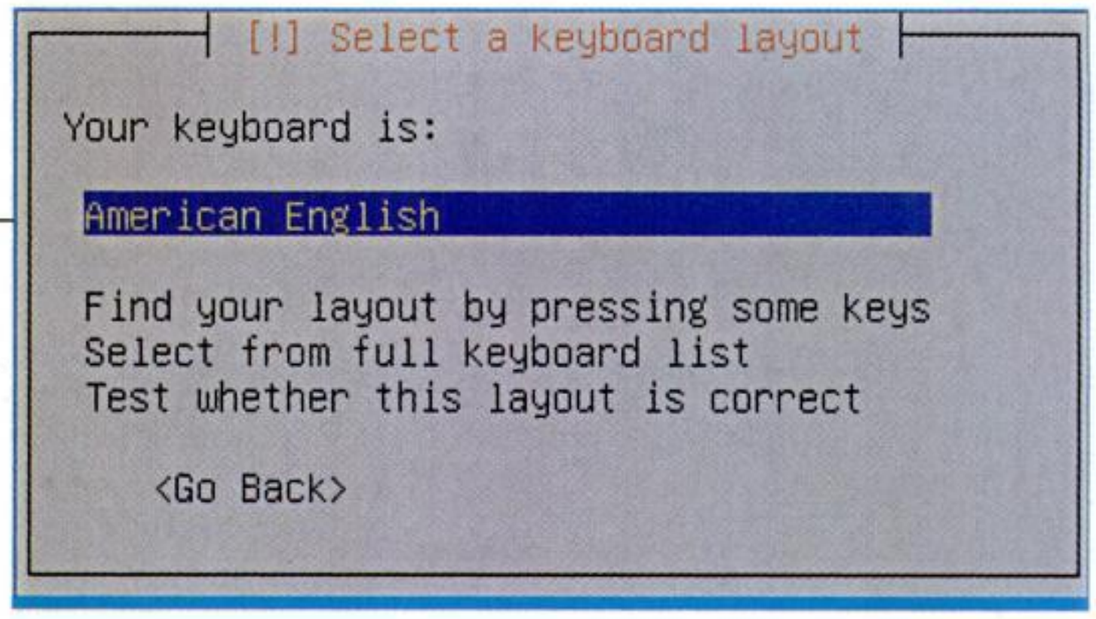
Now, you're ready to get started. It's as simple as ensuring that your mobo is set to boot from the optical drive and dropping the Ubuntu disc into the drive, then restarting your computer. When the PC boots, you'll be presented with the screen shown on the right. To start the install, just type "install" and press Enter

ubuntu
To boot as a Live DVD, press ENTER.
For a normal installation suitable for most desktop or laptop systems, type 'install' then ENTER.
To install only the base system, type 'server' then ENTER.
Press F1 for help and advanced installation options.
boot: _

If you'd rather give Ubuntu a test spin without installing it to your hard drive, just press Enter at the prompt, and you'll be able to try out the OS and ensure your hardware is supported.

3 Start the Install

Now the Ubuntu installer is going to collect some information about your system—the language you want to use, the type of keyboard you have, and the kind of hardware in your system. You'll have to answer a few questions, but for the most part, this portion of the install doesn't require your input. Once the installer collects info about your hardware, and configures the network adapter, you'll need to assign a hostname. Your hostname can range from your actual name to something clever, like a character from your favorite book or TV show. Once you've selected a hostname, you'll proceed to disk partitioning


[!] Select a keyboard layout
Your keyboard is:
American English
Find your layout by pressing some keys
Select from full keyboard list
Test whether this layout is correct
<Go Back>

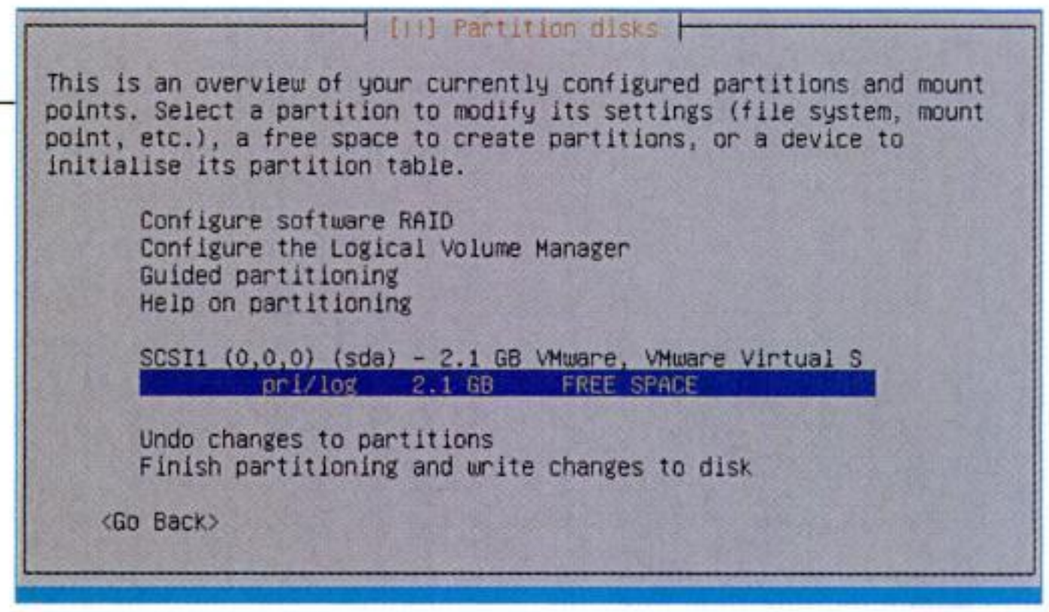
During the early portions of the install process, you'll need to answer a few simple questions—such as what language you speak and what kind of keyboard you use.

4 Partition Your Disk

This is the only truly dangerous part of installing Linux. Should you make a mistake here, you could conceivably erase the contents of your Windows drive, so pay attention and make sure you understand the process *before* you do anything.

Every partition on every hard drive in a Linux machine is given a unique name. The formula for names works like this: Parallel ATA hard drive names start with "hd", SCSI, SATA, USB, and FireWire drive names start with "sd". The next character in each drive's name is a letter, which tells you which physical drive a partition is on. For example, the first SATA drive in a system will be "sda", the second will be "sdb". After the letter will be a number. This number indicates the partition on a particular drive, so "sdb1" is the first partition on the second SATA drive in the system. To get an Ubuntu system working, you shouldn't need to know any of this, but a little knowledge never hurts.

If you're going to wipe an old drive and use it for your Linux drive, you can do that by using the "Erase entire disk" option and selecting the appropriate size disk. If you don't see the proper disk, you can choose to manually select the free space you want to use, then the installer will create a main partition for the OS and your apps, as well as a small swap space that Ubuntu will use as virtual memory. Make the changes to the drive, and you're ready to proceed to the second stage of the install.


[!!] Partition disks
This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space to create partitions, or a device to initialise its partition table.
Configure software RAID
Configure the Logical Volume Manager
Guided partitioning
Help on partitioning
SCSI1 (0,0,0) (sda) - 2.1 GB VMware, VMware Virtual S
pri/log 2.1 GB FREE SPACE
Undo changes to partitions
Finish partitioning and write changes to disk
<Go Back>

It's surprising, but the Ubuntu disk partitioning tool is very reliable, and reasonably foolproof. It chooses the most likely block of free space on your disk to install Linux without disrupting Windows.

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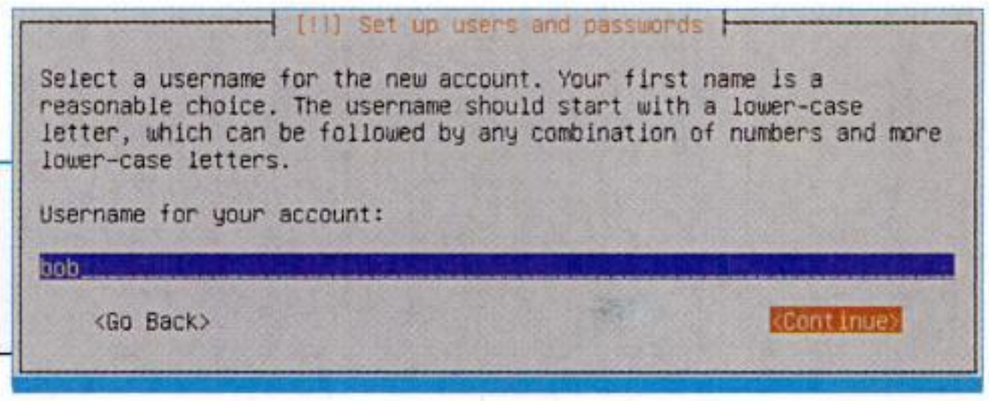
5 Install and Configure


[!!] Set up users and passwords
Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.
Username for your account:
bob
<Go Back>
<Continue>

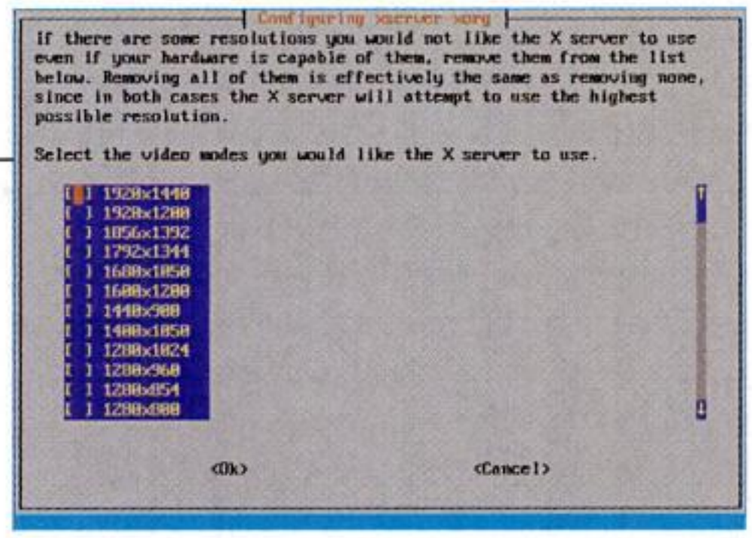
Make certain you remember the username and password you select. If you forget, it's probably easier to just reinstall Ubuntu than reset your password.

Once the disks are partitioned, you've done most of the hard work. The Ubuntu installer will install the grub boot manager, automatically configure it to work with any other OSes you have installed, and restart your computer. When you restart, you'll need to choose your time zone, and then you'll create a user account. Enter your full name, your desired username, and a secure password.

This is a good time to talk about Ubuntu's lack of a traditional Unix-style "root" administrator account. Instead of having the all-powerful root, Ubuntu gives the account you create during the install permission to use "sudo," which provides your account with temporary root-like privileges. If you're following online instructions that require root privs, you can run the commands on your Ubuntu install by prefacing the command with sudo. For example, if you need to edit your fstab file, you'd type `sudo nano /etc/fstab` instead of `nano /etc/fstab`.

Once you've created your account, the installer will configure apt-get, the package management application that Ubuntu shares with Debian. Ubuntu developers maintain several huge repositories of software that is preconfigured to run perfectly on Ubuntu. If you need to install, say, *OpenOffice*, apt-get will automatically download it from the Internet, then install it on your system, all you need to know is the name of the appropriate package.

6 Final Stages


Configuring xserver-xorg
If there are some resolutions you would not like the X server to use even if your hardware is capable of them, remove them from the list below. Removing all of them is effectively the same as removing none, since in both cases the X server will attempt to use the highest possible resolution.
Select the video modes you would like the X server to use.
[*] 1920x1440
[ ] 1920x1200
[ ] 1856x1392
[ ] 1792x1344
[ ] 1600x1050
[ ] 1600x1200
[ ] 1440x900
[ ] 1400x1050
[ ] 1280x1024
[ ] 1280x960
[ ] 1280x854
[ ] 1280x800
<Ok>
<Cancel>

It's crucial you select resolutions your monitor supports. If you choose incorrect settings, you can damage your display or render the GUI inoperable.

The installer will reboot again and install the actual applications you'll use on your system—think *Firefox* and *OpenOffice*. Your last task is to select the resolutions your desktop will run at. When choosing your resolution, make absolutely certain you don't select any options your monitor can't display. If you goof, you won't be able to boot into the GUI, and you'll have to either manually tweak the text file that configures your display or reinstall from scratch. You probably don't want to do either.

You can select as many resolutions as you wish, but Ubuntu will default to the highest resolution when you boot the first time. Once you select your setting, the machine will reboot again, and the install will be done!

7 What's Next?

You've installed Linux! Ubuntu comes with a ton of useful applications, including *Firefox, OpenOffice,* and *Evolution*—an *Outlook* clone. Everything you need to use your computer on the web, for email, or for basic office tasks is available to you out of the box.

There's still a ton of software out in the world that's available for you to try out. If you need more software, we recommend using the handy Ubuntu Add Applications program. It's right there at the bottom of the Applications menu.

If you have problems—and you will—the first place you should turn is Google. There's a ton of great Linux help info on the net, and Linux weenies are notoriously unhelpful if they don't think you've at least made an effort to find answers for yourself. If you can't find the answers you need on the net, try posting in the Alt-OS Abode of the Maximum PC forums (**http://maximumpc.com/forums/**). Now get out there and enjoy your Ubuntu! MPC

MAXIMUM PC 2006 READER SURVEY

Fill It Out, Mail It In, and Win!

We want to know what you think of *Maximum PC* magazine so we can do more of the stuff you like, less of the stuff you don't like, and add whatever you think is missing. Please check the box of the answer that best fits, except when instructed to do otherwise. Fill out the form below and send it to: *Maximum PC Reader Survey, 4000 Shoreline Ct., Ste. 400, South San Francisco, CA 94080. All* submissions received before February 1 will automatically be entered in a random drawing to win the Cooler Master CM Stacker case (reviewed on page 72). Photocopies of the survey will not be accepted.

Name_____

Phone number_____

Email_____

(The above information will only be used to contact the winner)

1. Where did you get this magazine?

❒ I'm a subscriber
❒ Bought it at a discount chain (Wal Mart, Target)
❒ Bought it at a newsstand/bookstore (Barnes & Noble, Borders)
❒ Bought it at a supermarket (Safeway, Kroger)
❒ Friend passed it on to me

2. How many issues of *Maximum PC* do you usually read per year?

❒ All of them!
❒ 6-12
❒ 2-6
❒ This is the first time I've read *Maximum PC*

3. On a scale of 1 to 5 (1 being the best, 5 being the worst) how would you rate your interest in the following topics?

____ PC games
____ Gaming hardware
____ Digital photography
____ Digital video how-to projects
____ Digital media (music, movies, etc)
____ Digital-rights management
____ Music creation
____ Video creation
____ Ripping CDs and DVDs
____ Hardware reviews
____ Hardware buyers guides
____ Software reviews
____ Using Linux
____ Using Mac OS X
____ Windows tips
____ Make Windows faster
____ Protecting your PC
____ Spam prevention
____ Spyware prevention
____ Wireless networking
____ Fix your PC
____ Build your own PC

Continued on next page→

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4. Do you find the tone of the writing to be:
- ❒ The right mix of fun and informative
- ❒ Too serious
- ❒ Too silly

5. Do you find the content of the magazine to be:
- ❒ Below your level of expertise
- ❒ Just right for your level of expertise
- ❒ Difficult to follow

6. How would you rate the content of the disc?
- ❒ Too many games, not enough apps/utilities
- ❒ Too many apps/utilities, not enough games
- ❒ Not enough content, period
- ❒ The disc is just right
- ❒ I don't get the disc

7. Rate the following sections of the magazine, where 1 = I like it; 2 = I neither like nor dislike it; 3 = I don't like it:
- ____ Quick Start
- ____ Head2Head
- ____ Watchdog
- ____ How-To
- ____ Ask the Doctor
- ____ R&D (White Paper)
- ____ R&D (Autopsy)
- ____ R&D (Previews)
- ____ In the Lab
- ____ Reviews
- ____ In/Out
- ____ Rig of the Month

8. Do you prefer stories that:
- ❒ Tell you how to do something *to* your PC
- ❒ Tell you how to do something *with* your PC
- ❒ Inform you of new technologies and products that will be available in the future
- ❒ Inform you about products available for purchase right now

9. Do you build or buy your PCs?
- ❒ I build my own
- ❒ I buy prebuilt

10. Which coverline is most interesting to you:
- ❒ Arch Rivals Face Off
- ❒ Best Case Ever?
- ❒ Tested: Video iPod!
- ❒ Build It! The Ultimate $300 PC
- ❒ Install Linux Now

Entrants must be at least 18 years of age. No purchase is necessary to win, and as a contestant you have not yet won. The odds of winning depend on the number of entries received. Future Network USA cannot be responsible for lost, late, misdirected, or incomplete entries. The prize is a computer case valued at $250 and is nontransferable and no substitutions will be allowed. Winners will be determined by a random drawing of all valid entries and the decision of Future Network USA shall be final. This contest is open to residents of the United States only. Return of any prize or prize notification as undeliverable will result in disqualification and an alternate winner will be selected. Winners are responsible for paying any income taxes on the value of the prize received. Void in Rhode Island, Puerto Rico, and where prohibited by law.

Ask the Doctor

Diagnosing and curing your PC problems

FIDDLIN' WITH NERO

*I recently built a BartPE disk with **Nero 6** on it, following Logan Decker's November 2005 "How To" article. Now I can boot into BartPE, but nothing happens when I launch **Nero**. I copied the contents of my **Nero** install directory to the bartpe\plugins\nero\ files directory, but when I tried to enable the plugin, BartPE said it could not locate some *.prf files. I then used Notepad to create an empty text file, changed its file extension to .prf, and placed it in the same directory where I had copied the **Nero** files. Only then could I enable the plugin and subsequently build the BartPE disk. What gives? I'm using **Nero** version 6.6.0.12.*

—Jon Zahos

We used *Nero* version 6.6.0.18 in our "How To" testing, but the Doctor doubts your version is the culprit; after all, this plugin has worked since version 5.5. What should happen is that *Nero* creates its own .prf file during the first launch, but for some reason, it's not doing that in your situation.

Did you remember to edit the penero.inf file with your *Nero* registration information and serial number? This is an important step because the information it enters into the Registry allows your system to recognize your copy of *Nero* as being registered; skipping this step might have prevented *Nero* from creating its own .prf file. As you discovered, however, you can easily satisfy the app by creating a blank .prf file from a text file.

RANDOM RESTARTS

My fancy-pants new computer suffers from completely random restarts. Its major components include an Asus A8N-SLI Premium mobo, an Athlon 64 X2 4600+, two 7800 GTX cards in SLI, 2GB of memory, and more fans than you can legally shake a stick at. I run Windows XP Pro. I like to leave it on during the day to run SETI@Home and to download, ahem, whatever it is I'm downloading that day.

Anyway, is there some sort of crash log I can access to see what might have happened? Or am I stuck staring at the computer for a whole day, waiting for my computer's metaphorical pot to boil over?

—Kapten Kalabajooie

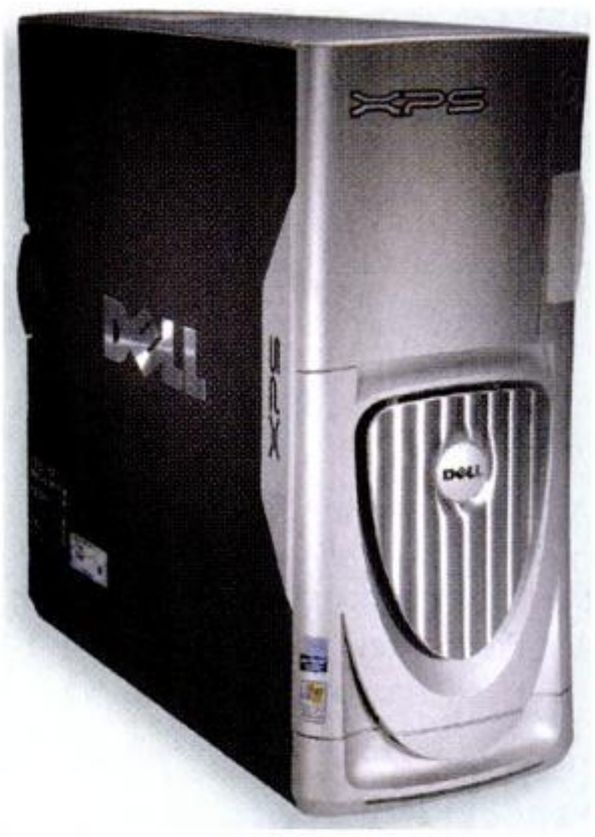
The easiest way to see how long your PC has been up is to hit Start, Run, and type `CMD`. Once you're in the DOS window, type `Systeminfo`. This will list a wealth of information, including the system up time. For a little more info on what might be rebooting Windows, go back into XP, right-click My Computer, select Manage, and look at the Event Viewer (under System Tools). A crash should be recorded under the Application Error Records and System Error Records. You can also set Windows XP to not restart after a bad crash. Right-click My Computer, select Properties, then Advanced, and then choose Settings under Startup and Recovery. In the box labeled "System failure" uncheck the item "Automatically restart."

Determining what's *causing* the crash is more difficult. It could be a number of things, ranging from an overheating CPU (SETI@Home is a demanding application) to an overtaxed power supply (running two 7800 GTX cards requires a high-quality, SLI-rated PSU).

SYSTEM OF A DELL

I went against my better judgment and took the easy way out by purchasing a Dell XPS 600, as opposed to building my own rig. But after hearing several rumors that Dell likes to use proprietary hardware, and that its mobos aren't designed to standard specs, I'm left wondering what future upgrade options I might have. I've heard, for example, that the power supplies in many Dell systems are wired so they work only with Dell motherboards. Is this true? Will I be hard-pressed to upgrade the mobo on this rig further down the road?

— Joe Marques



Dell's penchant for using proprietary mobos can trip up buyers who have a penchant for upgrading.

Continued on page 64→

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Pick the wrong power supply
and
they'll **roast more than your chestnuts.**

They're your average cold-hearted, take-no-prisoners crew. One wrong move and you won't even leave a greasy stain. Which is why you wouldn't face them with anything but an Antec Neo HE 550 powering your NVIDIA® SLI™ gaming rig. Its super stable, ultra-noiseless, environmentally friendly design makes it the perfect implement for saving the planet. Anything less would be a fatal mistake.

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2K Games recommends
NVIDIA graphics processors
for Serious Sam II.

MATURE 17+ M Blood and Gore Violence

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Ask the Doctor

Continued from page 62

They're not rumors, Joe. Dell has long preferred using custom-designed and -built motherboards and power supplies. Dell's older machines even use proprietary wiring in power supplies that otherwise look, smell, and fit industry specs. Plug a normal mobo into one of those PSUs, however, and you'll be lucky not to melt something.

The PSU in the XPS 600 is a custom design that runs along the bottom of the case, and the Doc is 95 percent sure that you won't be able to jam an off-the-shelf motherboard into the XPS 600's case without a lot of work. It can be done, but is it worth the trouble when you can just buy a new case and PSU instead?

Dell defends its use of proprietary parts by claiming its designs are superior to stock offerings. While the Doctor agrees that Dell hasn't crossed into the nightmarish territory of Packard-Bell-style computer design, he remains convinced that off-the-shelf parts and designs are a superior hedge against obsolescence.

SECOND OPINION

In your November 2005 issue, Bob Parlinari complained that a customer in his computer store had set a hard drive password on one of the laptops on display. This then made it impossible for them to access the hard drive. You suggested removing the batteries from the machine and stashing the power supplies behind the counter to prevent such tomfoolery.

I think I have a better solution: If store employees created hard drive passwords for these machines before they're put on display, wouldn't that prevent anyone else from creating a new password without first entering the old one?

—Martin J. Peverley

NOT THAT UPDATE!

*I've encountered an interesting anomaly with Asus' BIOS-update utility. The program finds and downloads the relevant patch, but when it displays a message indicating that it's going to restart my PC, my **Kodak EasyShare** installation software fires up and I never get the BIOS update.*

—Bill Morris

There's an apparent conflict between the BIOS update program and your *EasyShare* software. Try uninstalling the BIOS updater and download and install the latest version from Asus' website. If you continue to have problems, uninstall *EasyShare*, run the BIOS updater, and then reinstall *EasyShare*. If that doesn't work and you don't want to reinstall Windows, try a conventional floppy-disk BIOS update.

MISTAKEN IDENTITY

I'm running a Soltek SL-K8TPro-939 with an AMD 64 3500+ and two sticks of 512MB Kingston DDR400 memory. After I added two sticks of generic 512MB DDR400, the machine indicated during POST that it had DDR333 dual-channel memory. I pulled the Kingston sticks out and POST once again tells me the machine has DDR400 dual-channel memory.

I know you need matched sets for dual channel, but must all four slots have matched sets? I can't figure out what's causing this oddity.

—Craig

The Doctor's first prognosis is that you have a processor issue. Athlon 64s feature the memory controller *inside* the CPU, so that's usually the root cause of memory compatibility problems. The original Socket 940 Athlon 64 FX-51, for example, could operate at DDR400 only if two RAM slots were filled. Populate all four slots, and it would clock back to DDR333. You have an Athlon 64 3500+, which means you could be having the same problem—*if* your CPU is based on the older 130nm Clawhammer core (the newer 90nm Venice core has an improved memory controller). Also, some boards require you to manually set the RAM speed when using four DIMMs. The Doctor's first recommendation is to try manually setting the memory speed within the motherboard's BIOS. If that doesn't work, update your motherboard's BIOS and repeat this step. If your CPU has the Venice (aka "rev e") core, the processor *should* be able to run both sets of RAM modules as DDR400.

HAPPINESS IS A WARM LAP

*I just purchased a Sony VAIO VGNFS760 notebook, which I love. It's lil' GeForce Go 6400 handles **Battlefield 2**, **Max Payne 2**, and all my other fave games—it's an excellent lappy for the price. The only problem is that it locks up if I play too long. I'm 99 percent sure this is a heat problem, because it's thin and hot. I've seen all those little table fans you put under your laptop for extra cooling but I'm wondering if they're worth the price. Most are USB powered, which means they suck juice from your PSU and generate more heat. Are these worth a poo?*

—Justin Johnson

The best way to keep your notebook cool is to use it on a hard, flat surface with plenty of space around the exhaust vents. If you're using your notebook on your bed, or some other soft surface, it might block the exhaust vents and cause the notebook to overheat. A lap cooler will help keep it cool for use on your lap, and it might sufficiently lower the internal temperature to keep it from crashing, but it's still like trying to cool your desktop PC by blowing a fan *at* the case, instead of removing hot air from *inside* it. A properly designed notebook with unobstructed exhaust vents should run games all day without overheating.

WHAT'S THAT TICK-TOCK, DOC?

When I turn on my computer, which I use constantly, my hard drive makes these clicking sounds for a little while. The noises eventually go away, but when I download files, the clicking sounds come back. My hard drive is a Maxtor 4K060H3 and it's a couple years old. Do you think it's failing?

—Vinson Luu

Because there's no physical contact between your hard drive's platters and its read/write heads, you should never hear any clicking sounds emanating from it. The only sound you might hear is the faint "tick-tick-tick" as the head assembly's arms flick back and forth. You mention that you've owned this drive for a few years, so it's quite likely it's about to give up the ghost. Consumer drives such as the 4K060H3 are designed to operate for one to three years; enterprise drives typically have a five-year lifespan.

Here are two measures you can take to determine the drive's health. The first is to download Maxtor's *PowerMax* drive-integrity utility. Boot your system using the floppy disk this handy program creates, and it will run a diagnostic routine that informs you whether the drive is failing. Alternatively, or if your PC doesn't have a floppy drive, open My Computer, right-click the afflicted drive, and choose Properties from the pop-out menu. Click the Tools tab and then the button labeled "Check Now." When the Check Disk window opens, place a checkmark next to "automatically fix file system errors" and then click OK. Windows will examine the drive for bad sectors, which are areas of the drive that have become incapable of storing data. If you find even one bad sector, it's time to get your data the hell out of Dodge. MPC

Look! Up in the sky! It's a bird! It's a plane! No, it's not Superman, it's the Doctor! He might not be faster than a speeding bullet or stronger than a locomotive, but he's a whiz at curing bedeviling PC problems. Send an email describing yours to **doctor@maximumpc.com** and he'll leap tall buildings in a single bound to try and help.

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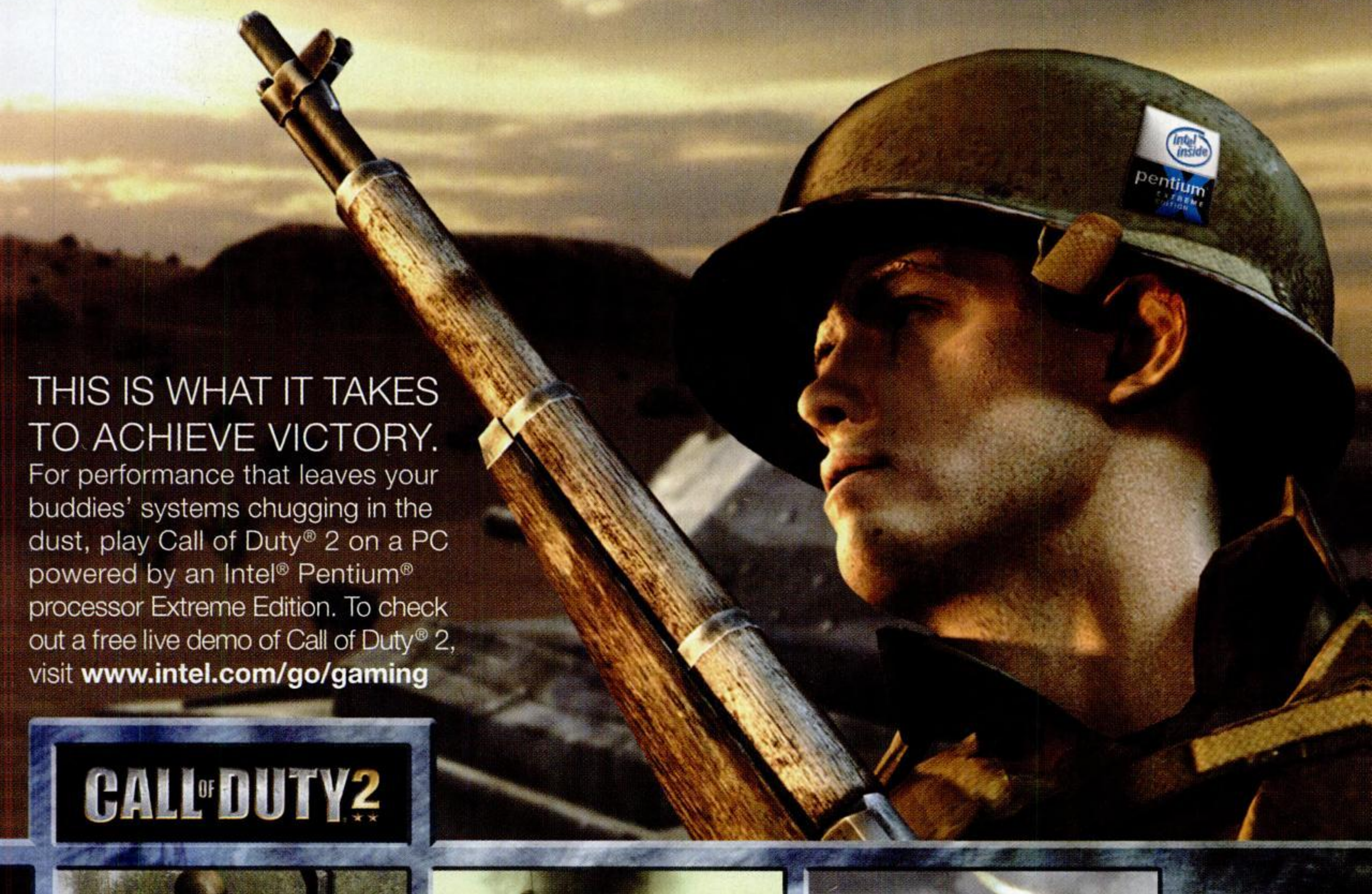

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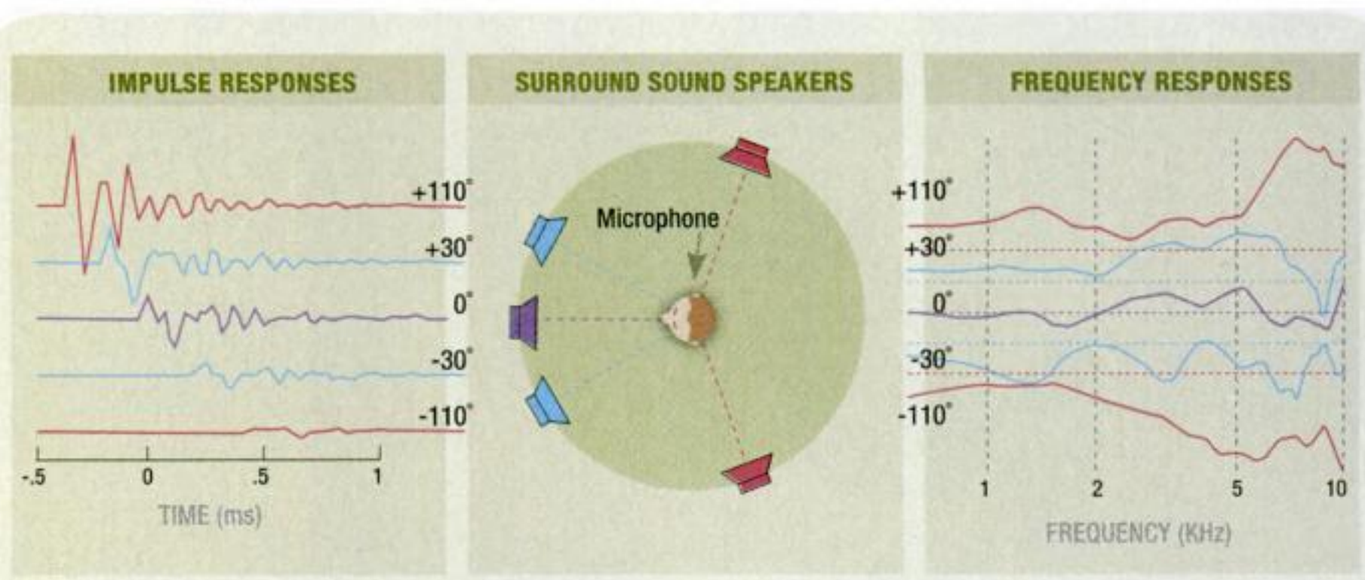
White Paper: **Virtual 3D Audio**

Audio engineers use HRTFs to mix five or more audio channels down into two while maintaining the spatial imagery of multichannel surround sound. Here's how they do it

BY WILLIAM **MATENS**

HOW IT WORKS **Head-related transfer function in action**



►The center panel in this illustration depicts a listener's head with a microphone positioned in the right ear. Five loudspeakers are placed around the listener. The panel on the left shows impulse responses, defined in terms of what happens at the right ear in comparison to a perfect impulse (which would look like a single vertical line at time zero). The purple curve on the left shows the impulse response for the center-channel speaker, with a direction identified as the 0-degree azimuth angle. The blue curves correspond to speaker directions 30 degrees removed from the frontal direction, and the red curves correspond to the speakers removed by 110 degrees.

►Although each of the speakers is equidistant from the center of the listener's head, the impulse arrives earlier from the right-rear loudspeaker (the top red curve, displaying the response for +110 degrees). In fact, the impulse produced by the left-rear loudspeaker (bottom red curve, displaying the response for -110 degrees) arrives almost a full millisecond later. In the right-hand panel, the corresponding frequency-response curves show that the amplitude of the sound reaching the right ear is quite a bit greater between 5- and 10kHz when it arrives from the right-rear loudspeaker, than from the left-rear loudspeaker. (Note that these frequency-response curves show changes in amplitude relative to the mean HRTF amplitude curve, for which HRTFs were averaged over many directions to get a single amplitude curve over frequency.)

You've no doubt heard or read the term "head-related transfer functions" (HRTFs) many times. Indeed, soundcard, speaker, and headphone manufacturers bandy the acronym about as though its definition were common knowledge. So what exactly are HRTFs, and what benefits are they capable of delivering?

HRTFs are best thought of as filters that describe what happens to sounds as they arrive at your ears from various directions. Once you have these filters available for audio signal processing, they provide a means to position virtual sound sources at arbitrary positions in the space around your head by tweaking the signal (hence the term "head-related").

This technology has had a substantial impact on PC-audio applications in the last 10 years, especially in relation to interactive games and multichannel surround-sound playback via headphones and stereo loudspeakers. This white paper explains how HRTFs are used to create such illusions. It will also examine the technical details of HRTF-based processing in two common PC sound applications: Interactive positioning of sound for games, and the mixing of 5.1-channel sound into just two audio channels that nonetheless allow you to distinguish the spatial direction of the sources as if they were arriving from five surrounding loudspeakers.

Just to make sure that readers are all on the same page, we'll begin with a brief description of the foundations of HRTF technology in acoustical science and digital signal processing (DSP), before proceeding to discuss its application to practical problems.

THE ORIGIN OF HRTFS

HRTFs come from acoustical measurements designed to capture how the sound that reaches your ears changes as the direction from which the sound arrives changes. The simplest way to measure this is to record (using a tiny microphone inside your ear), the response to a brief impulse (e.g., a click) produced by a loudspeaker. When you compare the recordings between ears, you discover that the head blocks high-frequency sound pretty well, as if casting an acoustic shadow on the side of the head facing away from the speaker. Including effects of the outer ear, these head-related filtering effects cause a change in the amplitude of sound reaching your ears at different frequencies, allowing you to easily determine the loudspeaker's position in 3D space.

How can digital filters be created to capture these details, which are thought to enable you to localize sounds in the world around you? The first step is to take your head out of the picture and record the impulse produced by a loudspeaker using the tiny microphone that you later will put in your ear. When you put your head back in the picture, we can see what has happened to the impulse that the microphone picks up.

As the frequency of the sound rises above approximately 2kHz, the sound amplitude (essentially the volume) will start to get higher at the ear facing the speaker. At the same time, the sound at the other ear will start to get much lower in amplitude. But because the head doesn't block low frequencies so well, the sound from a subwoofer placed beside you will sound almost exactly the same at *both* ears, although the sound will arrive at the far ear a little later than it does at the near ear. To give a better overview of the nature of these changes, the illustration above shows examples of HRTFs measured at a listener's right ear for five loudspeaker locations. The left-hand panel displays changes in the shape of a perfect impulse due to the acoustics of the head and outer ear. The panel on the right shows changes in frequency response. The upshot

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is that two things affect your perception of sounds around you: the difference in amplitude of the sound in each ear, and the delay between hearing the sound in one ear, and hearing the sound in your other ear.

SURROUND-SOUND VIA HEADPHONES

If you're given pairs of HRTFs for the five loudspeaker directions specified for typical surround-sound systems, it should be straightforward to transform each of the main audio signals from a 5.1-channel DVD audio program for headphone playback: You would just apply the appropriate left-ear and right-ear filters to each signal, producing five two-channel signals that can then be simply mixed together. How the filtering is done is a technical detail that boils down to a DSP (digital signal processor) problem that engineers can solve efficiently.

In a perfect world, the result should be identical to what you would hear if you were listening to playback via those five loudspeakers out in the middle of a flat snowfield (rather than in a room which will add its own reverberation to the sounds reaching your ears). Because this is not a perfect world, at least with regard to sound reproduction, there will always be noticeable differences.

Besides room reverberation, one of the most obvious differences is that turning your head during headphone listening produces a strange result: The virtual sound sources move as your head turns, so the sound maintains a constant direction relative to your head, rather than remaining at stable positions within the listening environment. In contrast to loudspeaker listening, in which you can turn your head to bring your nose into alignment with the right-front loudspeaker, headphone presentation of virtual sources arriving from the angle of the right speaker will shift 30 degrees to the right with that same head turn.

This might not seem to be a problem for casual listening, but the result can be very disappointing while watching movies or playing games, where you want to be able to distinguish between sources intended to arrive from frontward versus rearward directions. The solution is to incorporate head-tracking technology into the surround-sound headphones you're designing.

HEAD TRACKING EXPLAINED

Head tracking is the means whereby changes in the angle of your head (and sometimes even its position) are actively sensed by a peripheral device, which might be connected

Continued on next page→

LCD Monitor

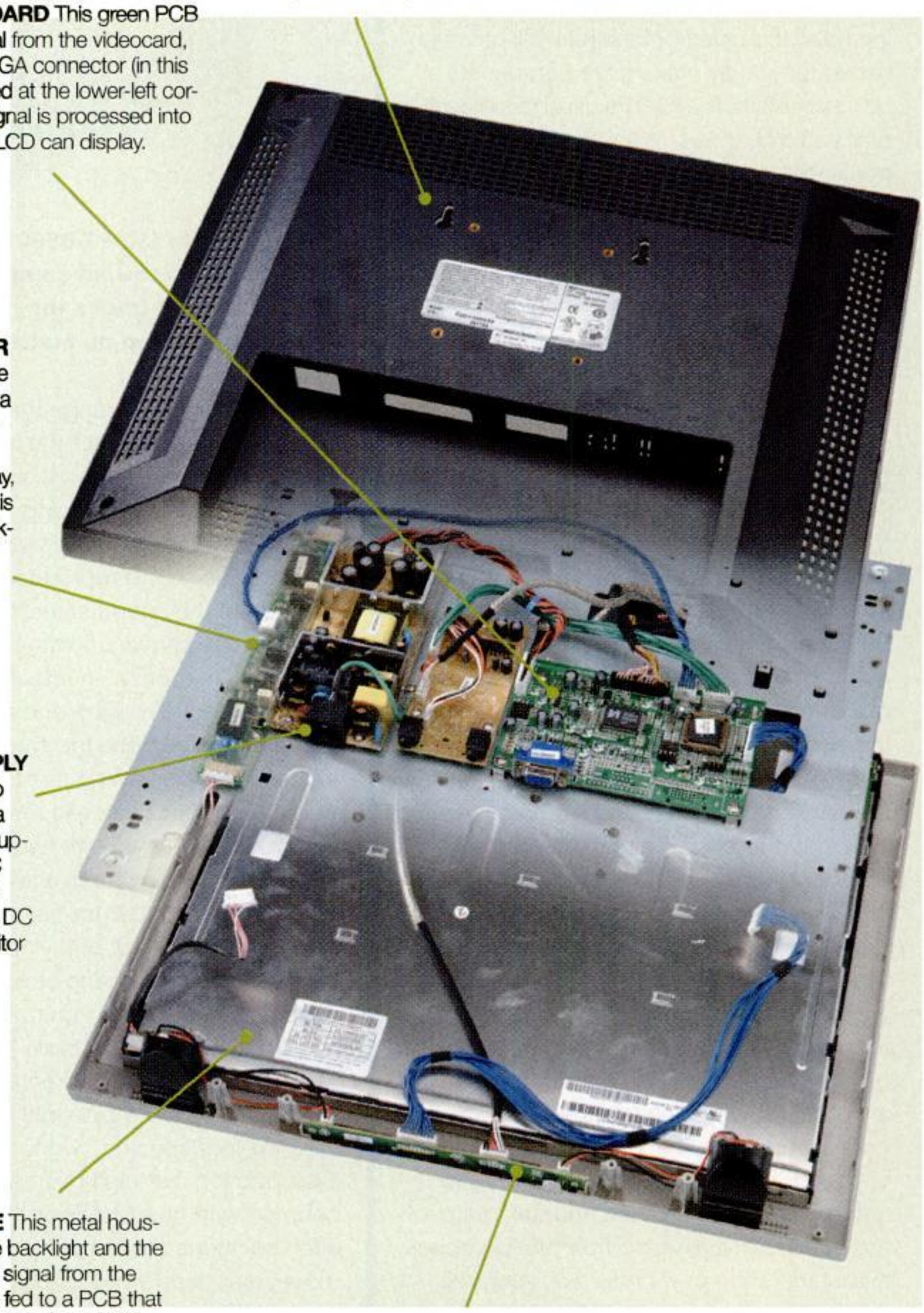
Don't let its slim figure fool you; a typical LCD desktop display is home to a lot more than just a skinny screen

BACKING An LCD's backing sits squarely atop a cluster of PCBs assigned with various functions. Small holes around the perimeter of the backpiece promote airflow to these electronic parts; larger holes, shown here at the indented midsection, provide openings for the ports (DVI, VGA, power, etc.) that make it possible for your PC to interface with the device.

CONTROL BOARD This green PCB receives a signal from the videocard, by way of the VGA connector (in this example) located at the lower-left corner. Here the signal is processed into something the LCD can display.

BACKLIGHT CONTROLLER When you make adjustments to a screen's brightness via the onscreen display, the information is sent to the backlight controller by way of the control board.

POWER SUPPLY An alternative to a power brick, a built-in power supply converts AC power from the wall socket into DC power the monitor can use.



LCD MODULE This metal housing contains the backlight and the LCD glass. The signal from the control board is fed to a PCB that spans the top edge of the LCD module (not visible here) and which contains the LCD controller, driver, and temperature compensation circuitry.

FRONT-PANEL CONNECTOR This narrow PCB directly connects to the buttons along the bottom-front of the monitor—those used to control brightness, contrast, color adjustments, etc.—and sends a signal, based on a user's input, to the control board.

Intellectual material

Continued from previous page

to the computer or to the headphones. When the HRTFs used in processing input audio are varied in real time in response to your head turning, the virtual loudspeaker stays at a constant position within the room, rather than at a constant angle relative to your nose. Thus, for DVD playback, when the center channel loudspeaker is supposed to be delivering the voice of a character that you see on the screen, the voice will stay put at the screen even though you may turn your head far to the left or right.

Likewise, the position of sound effects intended to arrive from the rear will be maintained for you by making the appropriate adjustments to the HRTFs used to process the rear audio channels. What allows the head-tracking headphone system to make such clear front/rear distinctions is that you can turn your ear towards a sound source to firmly establish where it is. If the sound is supposed to be directly in front of you, then turning your head to the right will make the sound arrive earlier at your left ear; but if the sound were to arrive from the rear, the opposite occurs—the sound will arrive earlier at your right ear as you turn your head to the right.

In fact, it's not absolutely necessary that the head tracking be done at your own head (egocentrically, in first-person perspective) for you to benefit from the real-time adjustment of HRTFs. The adjustment can be done exocentrically, via your control of a character's movement in a gaming scenario, in third-person perspective. For example, after many twists and turns, movement through a computer-generated visual scene might leave you spatially disoriented. But if through the many turns you always hear the watery sound of a distant fountain in a constant location within the game, then the direction in which you would need to go in order to return to the fountain is always clear.

This works for headphone surround in a wonderful way: The front/rear distinction here is supported by interactive adjustment of the HRTF-based audio processing to maintain a spatially stable mental image of the game's virtual world from the perspective of the character under your control.

VIRTUAL SURROUND-SOUND FROM TWO SPEAKERS

HRTFs can also be used to mix five audio channels down for playback over two loudspeakers while maintaining spatial imagery. These solutions are typically termed "virtual surround," and there are various ways to get a satisfying result.

Sony's unique MDR-DS8000 Digital Surround Headphone System uses HRTFs to produce 5.1-channel surround sound using two speakers. The device also features a built-in gyroscope that tracks the movement of your head so that virtual audio sources stay in the same position no matter which way your head is turned.

One way is to change the audio reproduction scheme so that the loudspeaker signals reaching your ears are more like what you get when listening to headphones. The most straightforward way to do this is to equalize the sound reproduced at your right ear so that the sound signal from the right loudspeaker shows up with a perfectly flat frequency response. In effect, you get rid of your HRTF for the right loudspeaker.

After you've done the same for the left loudspeaker, however, there is still a problem with reproduction using loudspeakers that you don't encounter with headphones: crosstalk. Crosstalk describes a scenario in which some of the sound from the right loudspeaker reaches your left ear, and vice versa. The technique for eliminating crosstalk is—you guessed it—crosstalk cancellation, and it has been practiced for more than 40 years to improve the loudspeaker reproduction of "head-related" (aka binaural) recordings.

Two-loudspeaker "virtual surround" reproduction can also be improved if coupled with head-tracking technology, but such solutions are not common. So if you move your head while listening to "virtual surround," you can quickly lose the advantage gained by simple crosstalk cancellation. There are alternatives that do not require you to hold yourself very still while listening, but in creating a larger listening area, something of the surround-sound effect is usually lost.

WHAT'S NEXT?

More conventional stereo down-mixing techniques involve the simple summing of signals. HRTF-based technology delivers a surround-sound experience with a much more adequate rendering of spatial imagery, while still utilizing only two audio channels. So what, if anything, is missing? There is always a need for better content to showcase what the technology can do, but there is also room for improvement in the deployment of HRTFs. Clear distinctions between front and rear virtual source locations are still difficult to achieve using loudspeakers, and they're pretty shaky when headphone reproduction doesn't include head tracking.

Because we all have outer ears of different shapes and sizes, it might be that individually adjusted or customized sets of HRTFs will provide better solutions for those users who care to take the time needed to select their optimum filters. Indeed, this is a hot topic for research and development of new HRTF-based technology, and it is expected that new solutions will provide improved spatial imagery for more and more users as these solutions are rolled out. MPC

BIO

William Martens, Ph.D. is an associate professor at McGill University. He is a perceptual psychologist specializing in spatial hearing research and the simulation of the acoustical cues used in human sound localization.

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CIVILIZATION IV

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"The only reason to stop playing Civilization IV is to tell other people just how good the game is."
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9.4 out of 10
"If you have even a passing interest in strategy games, world history, or getting less sleep at night, you owe it to yourself to give Civilization IV a try."
– GameSpot

5 out of 5 stars
★★★★★
"Civilization IV stands alone. No fan of strategy games should leave this on store shelves."
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200 BC | 216 AD | 1468 | 1894 | 1945

With Sid Meier's Civilization IV, history as you know it, is history. Rule throughout time and create your own legacy as you guide your civilization from the dawn of man through the space age and beyond. Implement new technologies, conduct diplomacy or wage war to grow your society and become the most powerful leader the world has ever known.

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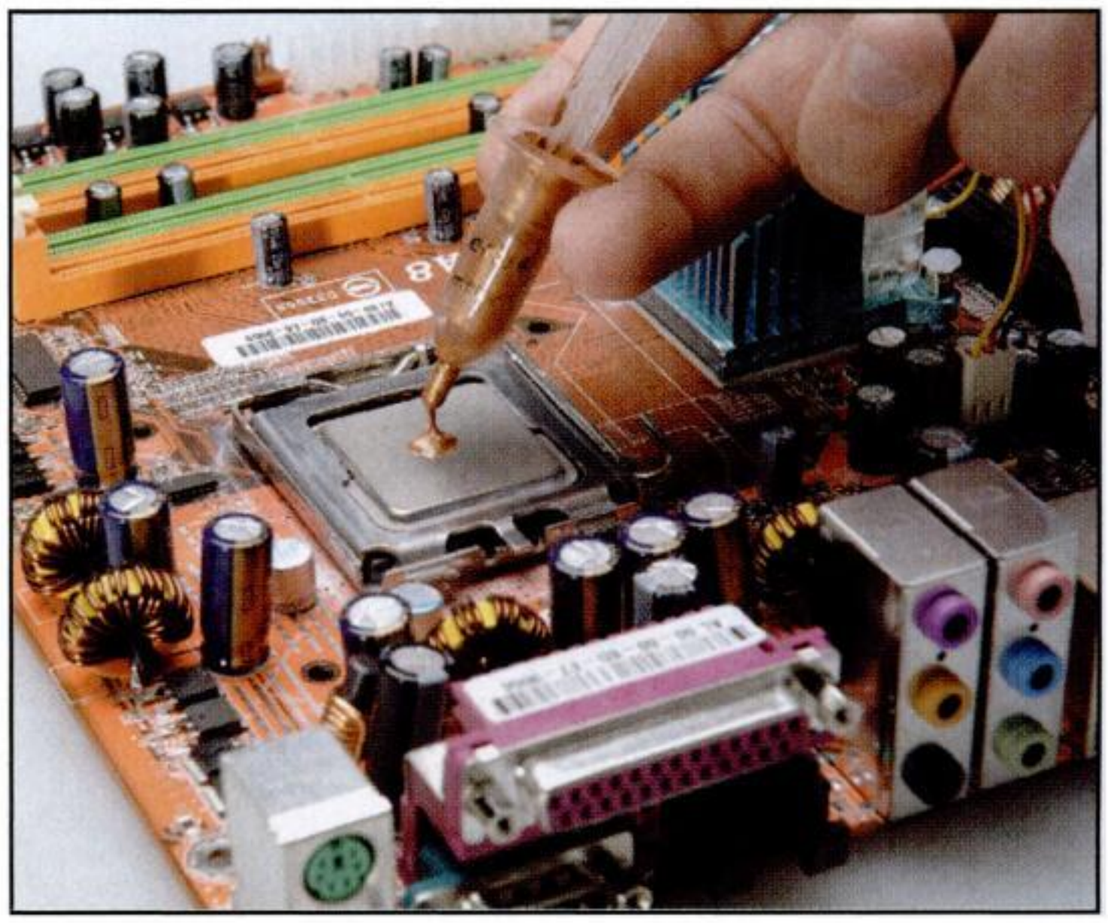
JOSH **NOREM**

Takes up the Thermal Paste Debate

How does high-end thermal paste stack up against the crud that comes with your cooler?



Silver thermal paste takes on ceramique, copper, and generic goop.

They may look like mirrored surfaces to your eye, but the bottom of your heatsink and the top of your CPU look more like a Thomas' English Muffin when examined under a microscope. Think nooks and crannies, folks.

Thermal paste is thus used to fill the microscopic gaps between the CPU and heatsink to ensure a solid connection between the two surfaces and promote efficient heat transfer. It's the peanut butter between two slices of Wonder Bread.

This is CPU Cooling 101—everyone knows you need thermal paste between the heatsink and the CPU—but what kind is best? There's the silver kind, the white ceramique, and the cheap goop that comes in a little plastic sleeve with your heatsink. For the uninitiated, it can be very confusing. Hardcore enthusiasts seem to always endorse the popular Arctic Silver 5, but why? Is premium thermal paste any better than the stuff that comes with your CPU?

To find out, I had Frozencpu.com send us its four most popular thermal compounds: Arctic Silver 5, Arctic Ceramique, OCZ Silver 5, and its in-house copper-based compound dubbed ThermalGrease 4. To make things even more interesting I bought a tube of generic paste labeled "Silicone heat transfer compound" at Radio Shack and threw it into the mix. To test the effectiveness of the pastes, I ran our Athlon 64 FX-55 zero-point system at idle and under full-load for an hour.

As the benchmark results show, there's no clear winner (although the Frozen CPU copper was the clear loser). Arctic Ceramique performed well, but it was only 1 C cooler than Arctic Silver, so it's hardly a decisive victory. Even the generic crap-compound in the 12 ounce tube did just as well as the fancy-pants Arctic Silver 5. The conclusion is thus: It doesn't matter what kind of thermal compound you use, as long as you use something.

BENCHMARKS

	ARCTIC SILVER 5	ARCTIC CERAMIQUE	OCZ SILVER 5	FROZEN CPU COPPER	GENERIC THERMAL PASTE
IDLE (C)	36	**35**	36	37	40
100% LOAD (C)	54	**53**	**53**	58	54

Best scores are bolded. We used an FX-55 CPU on an Asus A8N SLI Deluxe mobo with a Gigabyte Neon Cooler 8-BL heatsink/fan. Idle temps were recorded after 30 minutes of inactivity. Full load temps were recorded after running CPU Burn-in for one hour. All temps were recorded with the Asus A.I. utility.

Gordon Mah Ung

EVALUATES THE NEW NFORCE 4 CHIPSET

nVidia's nForce4 SLI X16 offers the first dual x16 consumer chipset, but is it worth an upgrade?

If eight channels are good, 16 channels must be better, right? That's what nVidia wants you to believe about its new nForce4 SLI X16. The SLI X16 is the first consumer chipset to feature a pair of x16 graphics lanes instead of the two x8 slots on nVidia's original nForce4 SLI chipset.

To suss out the real-world truth, I fired up Asus' new dual x16 slot-equipped A8N32-SLI with an Athlon 64 FX-55, 2GB of RAM, and a pair of GeForce 7800 GTX cards. After running some tests, I moved the cards over to an older Asus A8N-SLI with the dual x8 slots outfitted with another FX-55. The difference? *Nada*. At least not in any of the benchmarks I ran.

Using *FEAR*, *Quake 4,* and *3DMark05* at high resolutions and high AA settings, both rigs performed exactly the same. This isn't really a big surprise, as few apps really need the monstrous 8.8GB/s of bandwidth that dual x16's provide per graphics card.

nVidia is reporting numbers that show the dual x16 slots making a much bigger difference in performance—increases range from 1.6 percent all the way up to 5.6 percent. Of course, nVidia also used its higher-clocked 512MB 7800 GTX card, an FX-57, and beta drivers available only to nVidia. Regardless, I couldn't reproduce the same performance boost on my hardware using the publicly available drivers.

Does that mean I think x16 is useless? No. I think anyone purchasing an SLI board for the first time should buy one with dual x16 slots. It just doesn't make sense to trade up your dual x8 SLI system for a dual x16. Newer applications and graphics cards will certainly start to require the additional bandwidth down the road, but you shouldn't lose any sleep over it now.

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How We Test

Real-world benchmarks. Real-world results

Computer performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC*, our mantra for testing has always been "real-world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six real-world benchmarks that we use to test every system we review.

SYSmark2004: This is the most comprehensive application benchmark available, using no fewer than 19 applications to measure the time it takes for the PC to complete to real-world computer-intensive tasks. Our *SYSmark* score is a composite based on the time the test takes to complete several different types of tasks.

Adobe Premiere Pro: The leading nonlinear digital-video editor has recently been retooled with more support for multi-threading. We take a raw AVI file, add several transitions and a soundtrack, export it to a generic MPEG-2 file, and then report the time the script takes to complete.

Adobe Photoshop CS: We don't subscribe to Apple's half-baked idea that running one filter test in *Photoshop*, in one certain way, at a particular time of day provides an accurate measure of performance. Instead, we take a high-resolution image and throw it through just about every filter available in *Photoshop CS* at it. Our score is the time it takes for the script to complete.

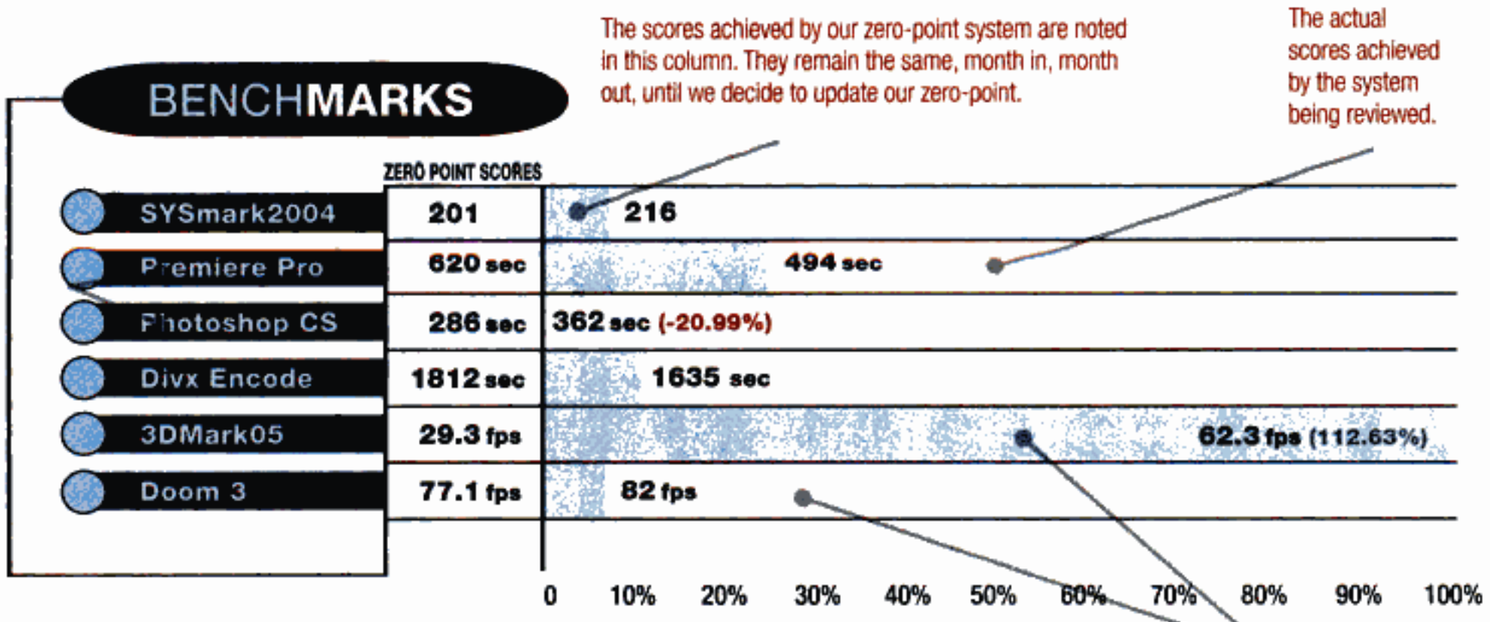
Divx Encode: Video encoding is today's time-suck. We transcode a short movie stored on the hard drive from MPEG-2 to Divx using *#1 DVD Ripper.* We report the length of time the process takes to complete.

3DMark05: After ranting about real-world tests, you might be surprised to find this "synthetic" graphics test in our suite. *3DMark05*, however, has proved to be the standard by which graphics cards and PCs that run them are judged. Instead of reporting a meaningless composite score, we run the third test at 1280x1024 with 4x antialiasing and 4x anisotropic filtering, then report the frame rate. Our zero-point system with SLI can't even break 30 frames per second.

Doom 3: Id's hugely popular game is a dark, scary, and serious test of PC horsepower. We run this game with 4x antialiasing and 4x anisotropic filtering, at 1600x1200 resolution, and report the frame rate.

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.


BENCHMARKS
The scores achieved by our zero-point system are noted in this column. They remain the same, month in, month out, until we decide to update our zero-point.
The actual scores achieved by the system being reviewed.
The names of the actual benchmarks used.
ZERO POINT SCORES
SYSmark2004 201 216
Premiere Pro 620 sec 494 sec
Photoshop CS 286 sec 362 sec (-20.99%)
Divx Encode 1812 sec 1635 sec
3DMark05 29.3 fps 62.3 fps (112.63%)
Doom 3 77.1 fps 82 fps
0 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

BEST OF THE BEST

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocard:
eVGA e-GeForce 7800GTX KO ACS3
The eVGA card remains the top dog until production versions of the 512MB GeForce 7800 GTX card hit our doorstep

Midrange videocard:
Leadtek WinFast 7800GT TDH Extreme
Fast, affordable and ready for SLI, the 7800 GT is a good balance of speed and performance

Soundcard:
Creative Labs X-Fi XtremeMusic

7,200rpm hard drive:
Western Digital WD400KD
The 400GB outperforms the larger 500GB drives

External backup drive:
Western Digital Dual-Option Media Center 320GB

Portable USB drive:
Seagate Portable External Hard Drive 100GB

DVD burner:
Plextor PX-716A

Widescreen LCD monitor:
Dell 2405FPW

Desktop LCD monitor:
Samsung SyncMaster 940BF
Better pixel response time for gaming makes the SyncMaster our new top dog

Socket 939 Athlon 64 mobo:
Asus A8N32-SLI Deluxe
Who can argue with dual x16 lanes for SLI?

Socket 775 Pentium 4 mobo:
Asus P5ND32-SLI
Run SLI with more bandwidth than before

Portable MP3 player:
Apple iPod 60GB

Photo printer:
Canon i9900

5.1 speakers:
M-Audio Studiophile LX4 5.1 (LX4 2.1 with 5.1 Expander System)

2.1 speakers:
M-Audio Studiophile LX4 2.1

Mid-tower case:
Lian Li PCV-1100

Full-tower case:
Cooler Master CM Stacker 830
Cooler, sturdier, and more configurable, the CM Stacker bests all other full towers

Games we are playing: Age of Empires III, FEAR, Brothers in Arms: Earned in Blood, Quake 4, Battlefield 2

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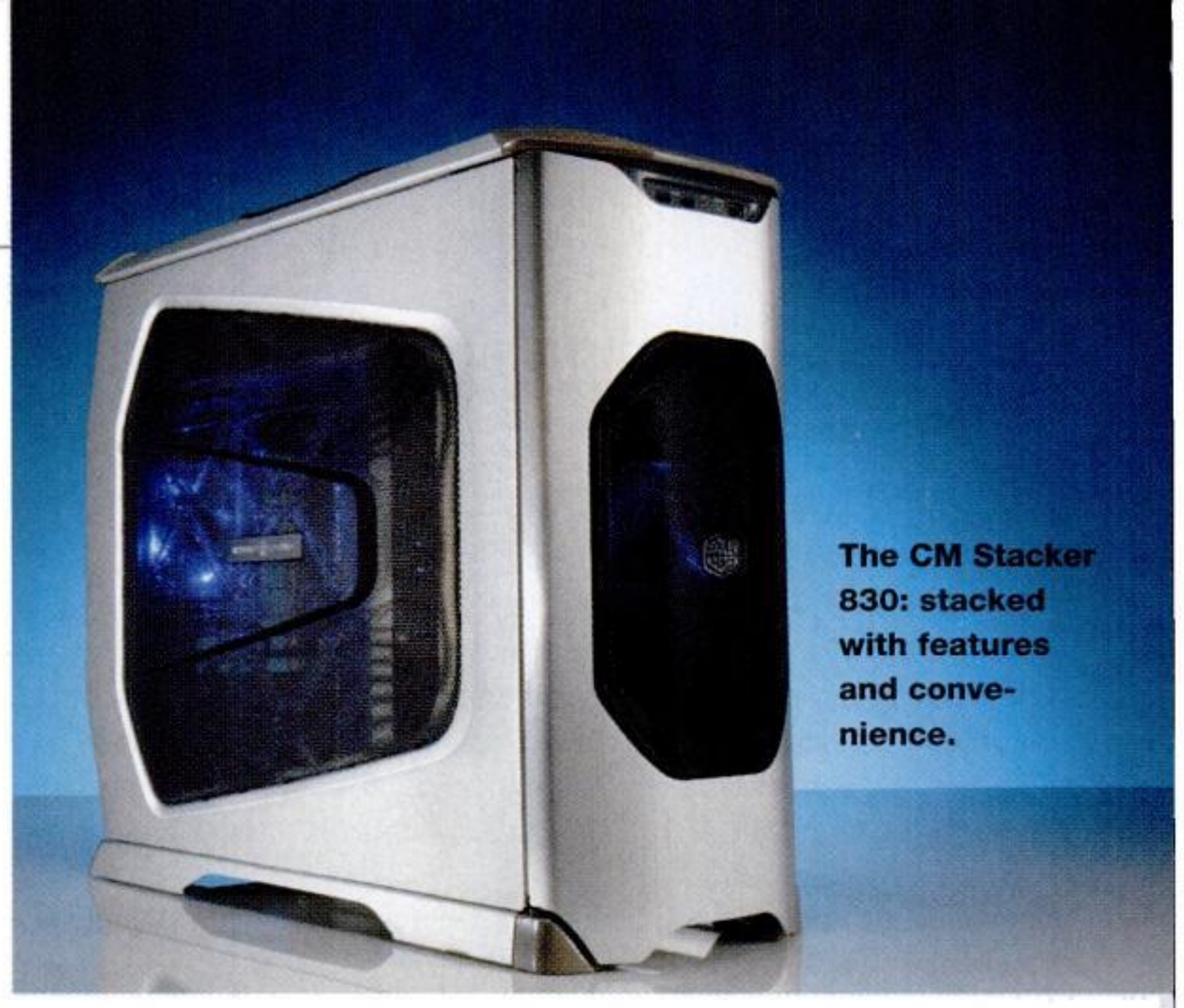
Cooler Master CM Stacker 830

Making the case for bigger, better, and ballsier

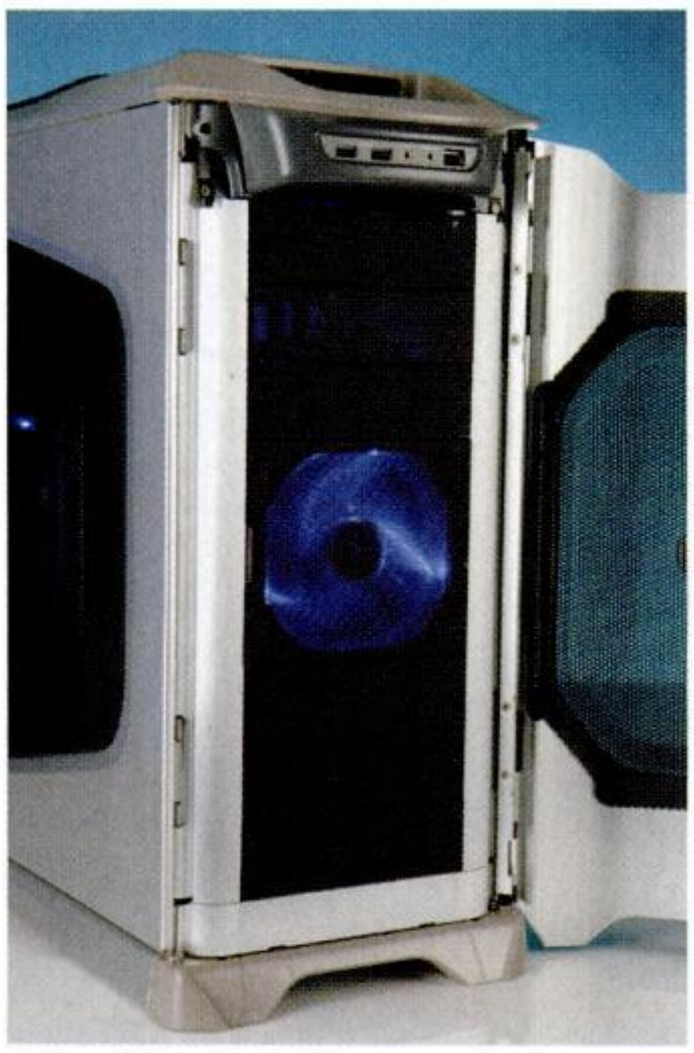


The CM Stacker 830: stacked with features and convenience.

The original CM Stacker was so audacious that we wondered what Cooler Master would do to one-up it: Now we know. The follow-up—dubbed the CM Stacker 830—improves on the original design in every way possible, and is one of the most badass cases we've ever laid our grubby (yet grounded for static) hands on.

So, what's new in the second rev of the Stacker? Damn near everything but the materials: It's still made entirely of aluminum. Now, before you go thinking all-aluminum cases are too flimsy, know that this is old-school, Wave Master-style aluminum. It's thick, and feels incredibly solid. This is not a case that flexes when you sit on it, but yet it's light enough that you won't inflame your hernia when you pick the case up by the handles built-into its top.

USB, FireWire, and audio ports are now on top of the case as well as in the front—a marked improvement. The internal audio cable that dangles from the connector sports four various plugs to ensure compatibility with every kind of audio jack on the market. The case still boasts 10 5.25-inch bays, and you can fill them with whatever you want—including optical drives, fan buses, and the included 3.5-inch drive cage, though the latter holds only three drives. If you have more drives than that, you'll have to purchase a 5.25-to-3.25-inch adapter. This is clearly a mark against the Stacker, though not a big one. The only PC we've seen in the past two years that had more than three drives is our very own Dream Machine—still, it'd be nice if Cooler Master threw in an adapter or two for storage mavens.



The front-bezel cover can open from the left, right, or be removed completely. While just one 12cm intake fan is included, two more can be added (we added the one in the middle with the blue LED—it's not included!).

Perhaps the biggest improvement to the Stacker is in the cooling department. The case's included hard drive cage has its own dedicated 12cm fan, but you can also mount two more 12cm fans in any remaining empty 5.25-inch bays. Cooler Master only includes an adapter for one additional fan. Where the case gets insanely cool is with the swing-out, removable side door that hides behind the left-side panel. It can hold up to four 6cm-12cm fans, and if you're not using it you can simply remove it with the push of a button. You can also attach another 12cm fan on the top of the case. And there's yet another 12cm exhaust fan in the traditional location—above the ATX connector block. In total, the Stacker 830 accepts nine 12cm fans, providing almost ridiculous cooling power. There's even an optional cross-flow fan that blows air across the motherboard, but it's not included with the case.

Other trick features include a front-panel door that can open to either side—extremely convenient! Removing the front-bezel slot covers is much easier with the new case, as now narrow metal wings on either side of the bezel swing out to give you easy access to the bezel's locking mechanism (before you had to pop out the slot covers using force from inside the case). When you push the wings back in place the bezel is secured.

Just like before, the case is completely tool-less, though you will have to attach the hard drives to their cage via screws. Aside from that, everything comes off or locks into place with just the twist of a lever. The removable motherboard tray

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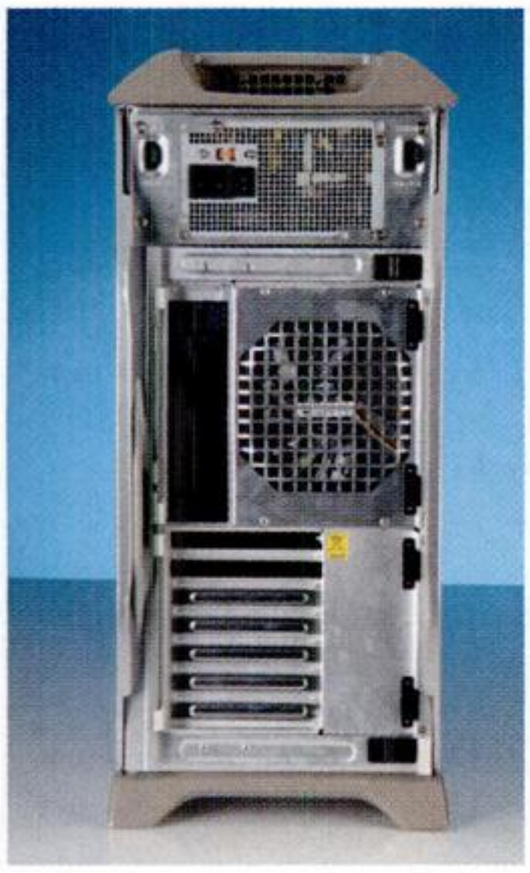
even has a handle on it, which should be a feature of every case. Both side doors and the motherboard tray unlock with the push of a lever.

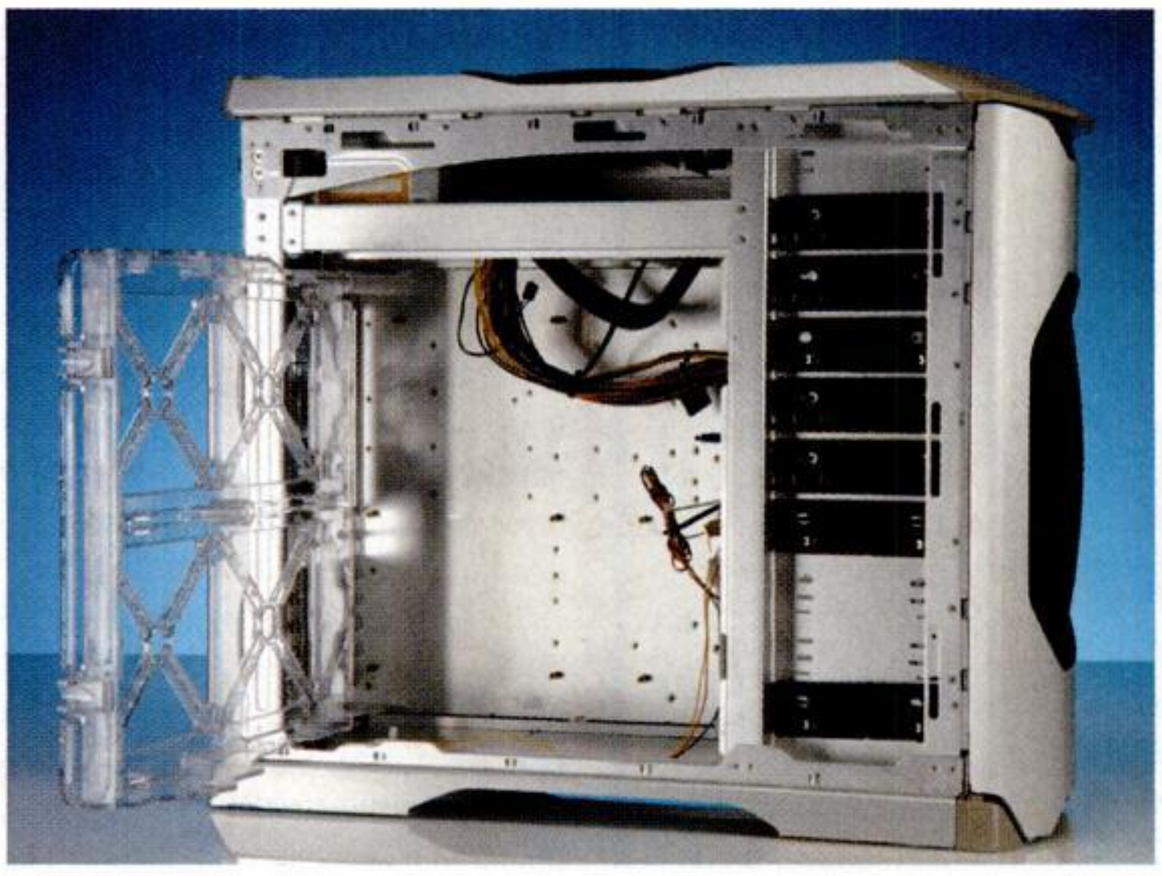
What's really shocking is the list of motherboard formfactors that the Stacker supports: ATX, E-ATX, Micro-ATX, BTX, Pico-BTX, and Micro-BTX. Yep, that's all of them—even BTX, should that formfactor ever see the light of day.

Aside from the aforementioned drive-adapter shortage, there's really nothing missing from the Stacker, aside from the "dream case" features we imagined in our Holiday 2005 case roundup—interior lighting, a tool tray, cable runs, and other pie-in-the-sky features we'd love to see. If Cooler Master saw fit to add these extras to the next iteration of the Stacker, we just might want to marry it.

—JOSH NOREM



It's hard to see in this picture, but the removable motherboard tray has a handle—which makes it that much more user friendly. The backplate is swapable for a BTX model, should that form-factor ever rise to prominence.



The transparent swing-out door holds four case fans that can range in size from 6cm to 12cm. Or you can easily remove it.

S1 Digital Media Center

This living room rig looks good in basic black

S1 Digital's sexy-looking Media Center Platinum Edition—which is available, for the record, in either black *or* silver—will look right at home next to your home-entertainment gear. Whether this extra-deep PC will *fit* into your home-entertainment center is a whole other question.

Measuring 15 inches wide, the Ahanix MCE601 case that S1 Digital chose to house this system is about the same width as most home-theater components. But measuring 18 inches *deep*, the case will extend three or more inches further into your cabinet than the average A/V receiver. You'll also need to take into account S1 Digital's location requirements: There must be a minimum of two inches of airflow clearance above the case; and if you place the unit in a cabinet, the back must be entirely open.

S1 Digital's Media Center Platinum Edition is available in black or silver to match your hi-fi components—just make sure it will fit in your entertainment center before ordering one.

The case houses a conventional ATX motherboard (an Intel D945PVS, to be precise), and if you stand the unit on its side (as we did in the photo to display its internal organs), its profile looks just like a mid-tower case. There's a double-layer DVD burner and a media-card reader stacked in front of the motherboard on the right, and a 3.5-inch hard drive bay in front of the motherboard on the left.

Media mavens with burgeoning music and movie libraries will appreciate the two vacancies in that drive bay, although it's an open question as to whether or not the case's twin 6cm fans would be able to provide adequate cooling. The exhaust fans—which are quiet, but by no means silent—are located about as far as they can be from the drive bay. The Nexus PHT-7750 CPU heatsink/fan combo, on the other hand, whirred along while producing almost no noise at all—not bad considering that it's tasked with cooling a 3.2GHz Pentium 4 640 (with its hot-as-magma Prescott core).

The presence of a GeForce 6600 GT, a dual-tuner standard-definition TV card, an HDTV tuner card, and an 802.11b/g LAN card leaves just one open PCI slot on this ATX mobo.

S1 Digital offers a very limited number of options, but the stock machine comes with just about everything you could want in a media-center PC, including a dual-tuner Hauppauge PVR-500MCE card for standard-definition TV and FM radio, and a single FusionHDTV5 tuner card for over-the-air high-definition TV broadcasts (you'll need a $40 antenna).

The system also comes with 1GB of memory, a 320GB Western Digital SATA hard drive, Gigabit Ethernet on the mobo, and an 802.11b/g LAN card in one of the PCI slots. The media-card reader is hidden behind a drop-down panel and handles just about every flash memory standard you can think of, including SD, xD, CompactFlash, Microdrive, and Memory Stick. You'll also find two USB 2.0 ports and a FireWire port conveniently located in the hidden bay.

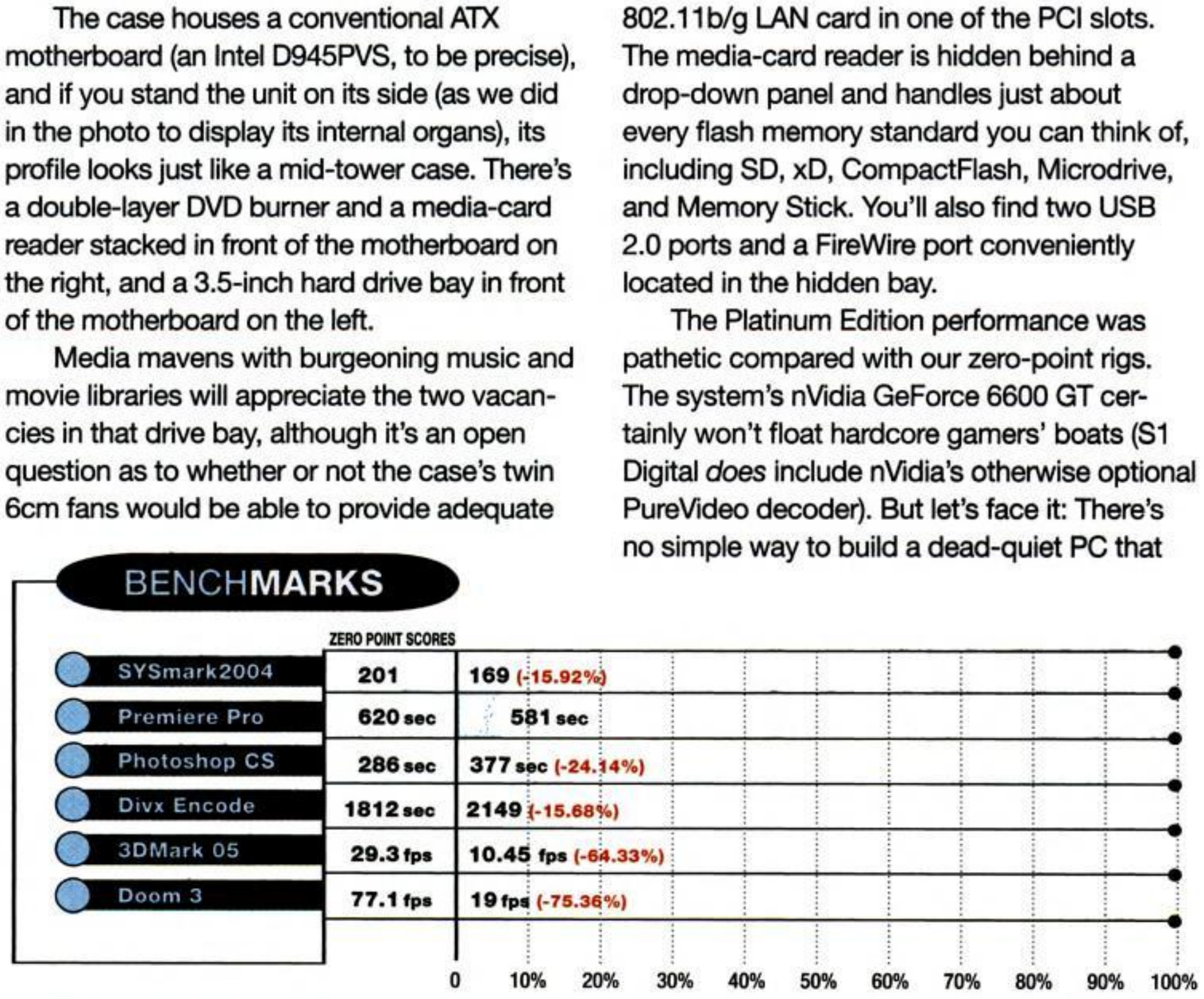
The Platinum Edition performance was pathetic compared with our zero-point rigs. The system's nVidia GeForce 6600 GT certainly won't float hardcore gamers' boats (S1 Digital *does* include nVidia's otherwise optional PureVideo decoder). But let's face it: There's no simple way to build a dead-quiet PC that delivers tremendous performance, while maintaining the rig in a formfactor that seamlessly blends into a home-theater system. Judged by those criteria, our biggest knocks against this system are that it's more than a bit portly and a trifle loud.

—MICHAEL BROWN

UNDER THE HOOD

BRAINS	
CPU	Intel Pentium 4 (3.2GHz, 2MB L2)
MOBO	Intel D945PVS (Intel 945P Express Chipset)
RAM	1GB Geil DDR2-533 (two 512MB sticks)
LAN	Gigabit LAN (Intel Pro/1000 PM), Gigabyte GN-WPKG 802.11b/g Wireless Card
HARD DRIVE	One 320GB Western Digital WD3200JD (7200rpm SATA)
OPTICAL	NEC ND-3540A DVD+/-RW (double-layer)
BEAUTY	
VIDEOCARD	nVidia GeForce 6600 GT, 128MB (500MHz core, 500MHz DDR3)
SOUNDCARD	Intel HD Audio (with Dolby Digital Live)
CASE	Ahanix MCE601 with Ahanix MPD-350T 350W PSU
BOOT: 49 sec.	DOWN:37 sec.

BENCHMARKS



Our zero-point reference system uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

S1 DIGITAL MEDIA CENTER

+ GLORIA SWANSON

Equipped with just about every media device you can think of.

– SWANSON TV DINNER

Big case won't fit in some entertainment centers; not quiet enough.

8

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And everything else your digital heart requires to bring an end to all you face.

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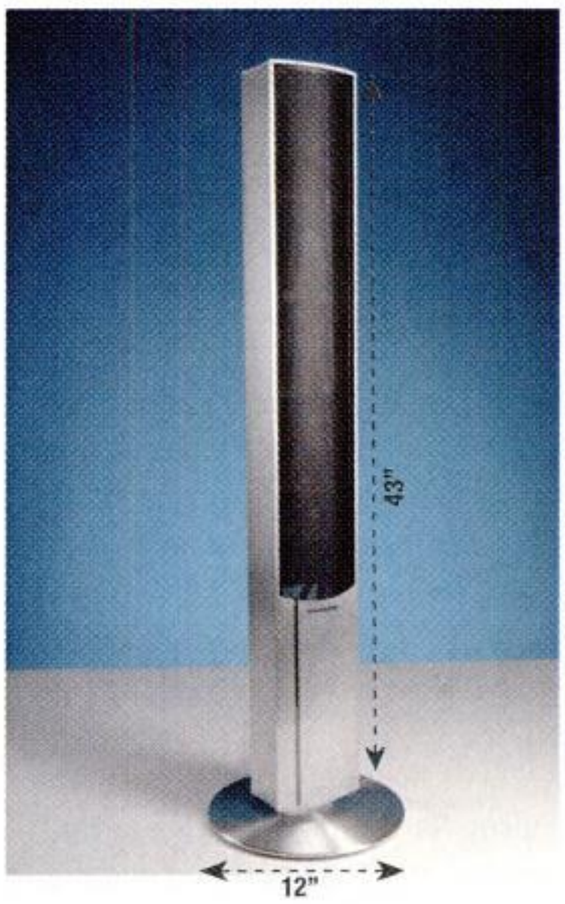
Thermaltake Symphony External Water Cooler

A must-have for HTPC users, but nobody else



It's not a killer home theater speaker—the Thermaltake Symphony is an external liquid-cooling radiator in disguise.

Just when we thought external radiators for water-cooling kits couldn't get any more outlandish, along comes the freakishly large Thermaltake Symphony. We thought the Zalman Reserator's 24-inch tank was big, but the Symphony dwarfs it. The problem with the Symphony is that although it provides fantastic cooling and overclocking performance while being extremely quiet, it's insanely expensive and cools only the CPU. For this much money, we expect a VGA water block in addition to a CPU block, as well as the ability to add even more water blocks. No dice. This is a CPU-only kit, and as such its price isn't justified.

As you can see, the Symphony is designed to look right at home alongside the home theater system in your living room. It resembles an audio speaker, and behind its black mesh grill resides an enormous 24-inch radiator, which is cooled by five ultra-silent 12cm fans spinning at 1400rpm. At the base of the radiator are two 12V pumps that connect to the inlet and outlet tubes. Water moves to the all-copper CPU water block by way of two very long sections of black silicone tubing. The tubing comes pre-connected to the water block and radiator, and as we mentioned, Thermaltake doesn't provide hardware to add more cooling blocks into the circuit. Like the Reserator 1 Plus, the Symphony uses quick-detach valves, which work splendidly, so you can unplug the radiator for leak-free transport. Installation is straightforward, although motherboard removal is required to install the CPU water block, even on AMD Socket 939 systems. Once you attach the water block, you just fill the reservoir and you're done. As the benchmark chart details, the Symphony's performance was exceptional. Despite sporting five 12cm fans, the unit is totally inaudible during operation because the fans are barely spinning. We were even able to overclock our 2.6GHz FX-55 processor to 2.75MHz.

At the end of the day, the Symphony is a niche product. If you must hide a water tower among your home theater gear, look no further. For every other possible use, we'd rather use Zalman's Reserator 1 Plus. It's just as quiet, less expensive, and cools your CPU *and* your GPU.

—JOSH NOREM

BENCHMARKS

	SYMPHONY	STOCK COOLER
IDLE (C)	**29**	36
100% LOAD (C)	**40**	52

Best scores are bolded.

THERMALTAKE SYMPHONY **7**

$400, www.thermaltake.com

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Logitech Z-5450 Digital

This 5.1-channel system trades wires for noise

Logitech's Z-5450 Digital boasts wireless surround speakers that spoil the audio experience by introducing background noise.

The most common problem with setting up a surround-sound speaker system **is that you have to string cables across the floor to the** surround channels. **Logitech's Z-5450 uses a frequency-hopping 2.4GHz transmitter to** wirelessly **send audio to the surrounds, but this introduces a whole other** problem: hiss.

We suspected this would be an issue, but we held out hope that Logitech had achieved some technological breakthrough. THX certification notwithstanding, that's not the case. We tested the Z-5450 system with a variety of games and DVD-Audio discs, and the speakers sounded good, but not great. The hiss emanating from the wireless surround channels, however, was intolerable.

Actually, describing the surround channels as "wireless" is not entirely accurate, either. You still have to plug each speaker into an AC outlet, because it wouldn't be practical to use batteries to power the amps and wireless receivers in each cabinet. The front channels and the subwoofer are powered by the amp in the subwoofer.

Although the Z-5450 is $100 more expensive than Logitech's top-of-the-line Z-5500 Digital ($500 vs. $400), the speakers use drivers that are very similar to the company's $200 Z-5300e system. Unlike its cheaper stable mate, however, the Z-5450 comes with a wireless remote and an elegant control center with a digital LCD and a plethora of inputs and outputs.

The Z-5450 offers hardware decoding for a variety of digital audio formats, including Dolby Digital, DTS, and DTS 96/24 (perfect for decoding DVD-Audio discs). The decoder is redundant, however, if you're hooking up this system to a PC outfitted with a Sound Blaster Audigy, an X-Fi, or Intel's HD Audio.

If you're looking for a powerful surround-sound system with a built-in decoder, look at Logitech's Z-5500: It's cheaper *and* more powerful than the Z-5450. You'll have to put up with wires, but that's better than tolerating hiss.

—MICHAEL BROWN

SPECS

SATELLITE SPEAKERS	2.5-inch aluminum phase plug driver; magnetically shielded
SATELLITE POWER	38 watts to front left/right channels, 42 watts to center, and 40.5 watts to left/right surround channels
SUBWOOFER	Mechanical band-pass design, with an electronic crossover and a 6.5-inch high-excursion paper cone driver
SUBWOOFER POWER	116 watts
SIGNAL-TO-NOISE RATIO	Wired: 90dBa; wireless: 82dBa

LOGITECH Z-5450 **6**

$500, www.logitech.com

Silverstone Sugo SG-01

This mid-size case offers far more flexibility and power than any small formfactor machine

The Silverstone Sugo SG-01 is extremely easy to work in—and on.

From the Antec Aria to the Aspire X-QPack, medium formfactor enclosures have always had one fatal flaw: You can pack 'em with a ton of hardware, but not a standard ATX 12V PSU.

Silverstone's Sugo SG-01 addresses that problem by letting you use just about any standard PSU you want. Want to run a fanless PSU? You can. What about a 550-watt jobbie? Not a problem. In fact, Silverstone shipped our review unit with a modular 600-watt PSU. The SG-01, however, is usually sold *sans* power supply.

True to Silverstone's heritage, the SG-01 features a beautiful brushed-aluminum exterior that reminds us of Falcon Northwest's FragBox 2. That's not surprising seeing as Silverstone manufactures the FragBox 2 enclosure for Falcon. The SG-01 features some improvements, such as the ability to mount two optical drives, but unlike the FragBox, the SG-01 is handle-less, and a case window and lighting effects are also AWOL. And the SG-01 is definitely not as striking as the FragBox 2; in fact, the former seems a bit bland by Silverstone standards.

We like the extra 6cm fan mount that Silverstone added—it sits just above the add-in cards. This fan could be used to either blow cool exterior air directly onto hot videocards or exhaust the heat — if Silverstone provided a fan, that is. Why the company skimped on a 50-cent fan we don't know.

Of course, it's a royal pain in the PS/2 port to access add-in cards. Before you can remove or add a part, you have to remove the 6cm fan assembly. This is a minor quibble, however, as the SG-01 is easier to work in than any other medium formfactor box we've tested. And unlike SFF cases with an integrated mobo, which lock you into a particular CPU platform, the SG-01 lets you build anything you want, provided you can find the MicroATX motherboard that fits it.

That makes the SG-01 the most flexible medium formfactor we've ever tested.

—GORDON MAH UNG

SILVERSTONE SUGO **9**

$150, www.silverstonetek.com

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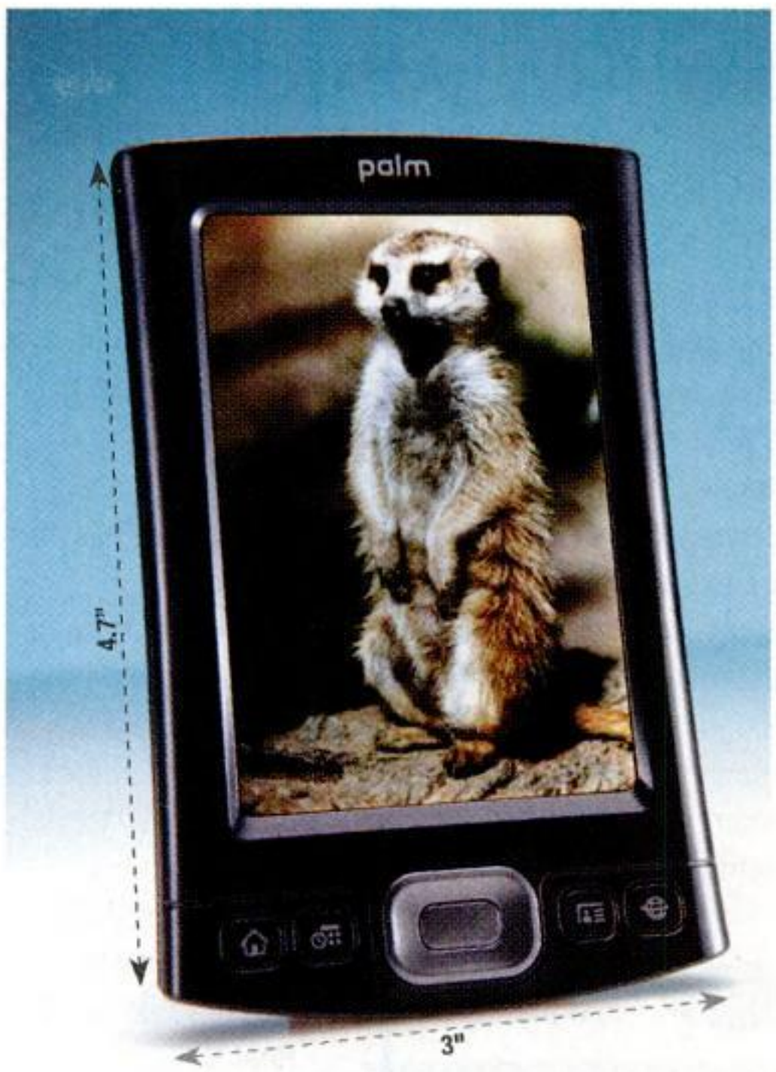
Palm TX

There's life after the LifeDrive

Palm's hard drive-based LifeDrive was, apparently, as much fun and games as the company could take for a while, so it's back to business with the Palm TX, a sleek upgrade of the Tungsten T5. The staid 312MHz Bulverde proc from Intel, the 320x480 LCD, and the 128MB of nonvolatile RAM won't win over any hardware fetishists, but neither will the reasonable $300 price frighten away the rest of the flock. The TX weighs a bit more than 5 ounces, and 100MB of the built-in memory is available for your day-job spreadsheets and email. Anything more than that, such as movies or MP3s, would be best copied to an SD card and dropped into the TX's expansion slot.

Go ahead and breathe a sigh of relief—the TX supports Wi-Fi and Bluetooth connections, so you can web surf, check your email (the bundled *VersaMail 3.1* supports up to eight accounts, including POP, IMAP, and Microsoft Exchange servers), and grab stuff from a co-worker's PDA with your invisible hands. We miss, however, the Drive Mode available on the T5 and LifeDrive which allows your handheld to be recognized as an external storage device through any USB connection. Battery life was acceptable, with continuous MP3 playback clocking in at a hair more than eight hours.

Palm still lords over Windows Mobile (even the 5.0 version) in one-handed navigation, allowing you to use the five-way rocker switch and application buttons to launch applications, scroll through directories, and select files without using the stylus or taking your other hand off your revolver. And switching from portrait to landscape mode is much easier than in Windows Mobile—you can change with a single stylus tap.



The deep, dark blue finish of the Palm TX is plastic, but appears handsomely metallic, and won't scratch when breathed on (hello, Apple?)

The best part, however, has to be seen to be believed—the screen is gorgeous and visible even in direct sunlight or in the car. That alone is reason enough to put your old Palm in a shoebox and bury it in the backyard.

PALM TX **8**

$300, www.palm.com

—LOGAN DECKER

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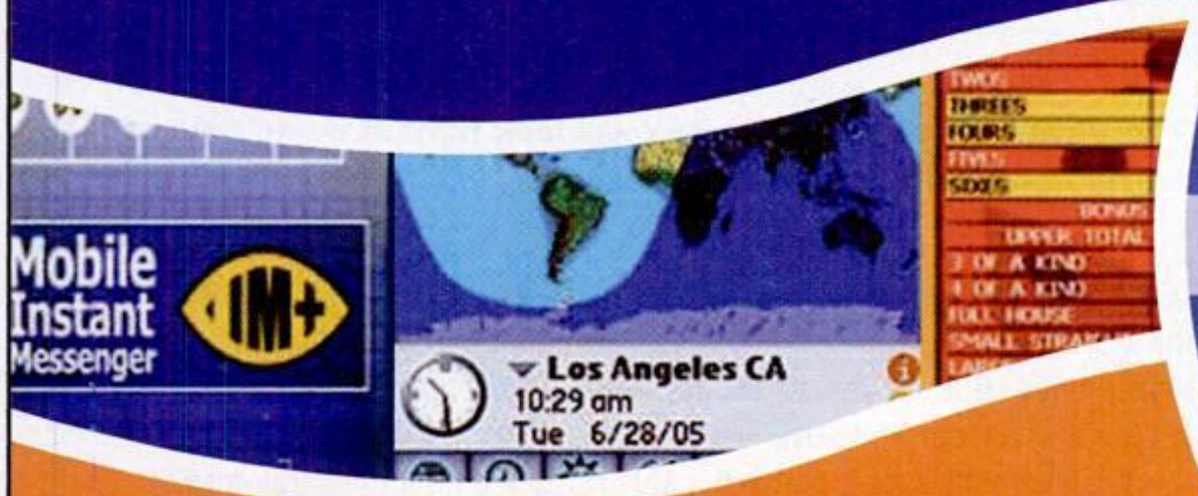

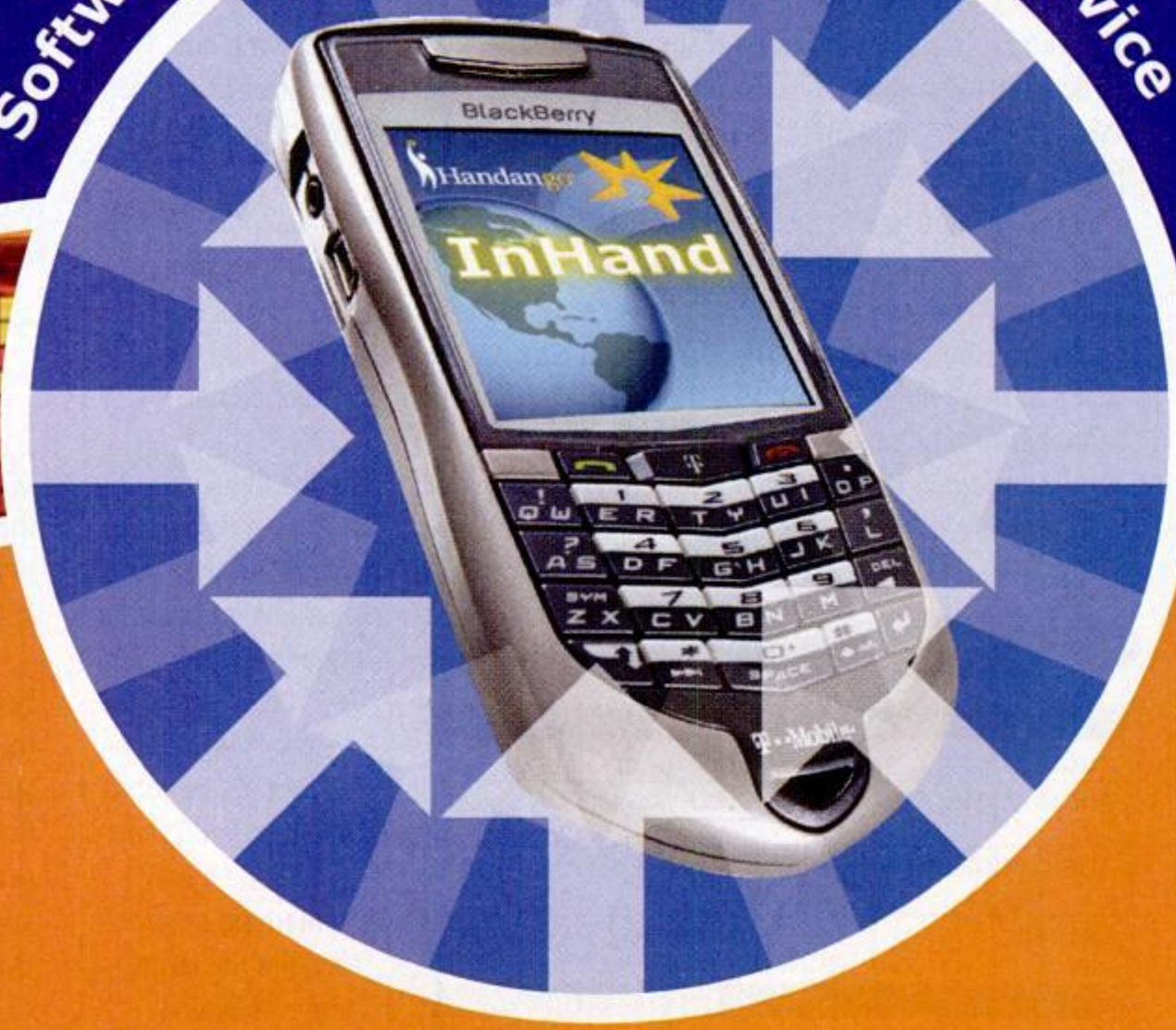

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*Handango InHand supports the Treo 600/650, BlackBerry devices, Windows Mobile powered phones and the Sony Ericsson P800/P900/P910.

Pinnacle ShowCenter 200

This A/V streaming box has too many limitations

Pinnacle's ShowCenter 200 can stream audio, digital photos, and video, including high-def.

Pinnacle's ShowCenter 200 receives not only audio streams over a wired or wireless network, but digital video (including HD), digital photos, and Internet radio, too. Ultimately, however, we found the device to be hobbled by design shortcomings and DRM-related constraints.

The device sports a bounty of audio-video outputs, but HDTV owners will be disappointed by the absence of a DVI or HDMI port. You can plug digital cameras and storage devices into the handy front-mounted USB 2.0 port.

We connected the ShowCenter 200 to an 802.11g network for our tests. The server software consumed minimal CPU and memory resources on the host PC, and a Sigma Designs Realmage EM 8620 processor handled the decoding duties at the receiving end. We rarely saw more than 3 percent CPU utilization while streaming formats the player supports natively. Video and audio quality were uniformly excellent.

Pinnacle's *MediaManager* software makes it a snap to organize the video and photos stored on your hard drive, but Real Networks' Rhapsody is the only music subscription service it recognizes. Importing *iTunes* playlists is a clumsy process requiring third-party freeware, and then you're restricted to importing MP3s because there's no support for AAC files (the ShowCenter doesn't support FLAC or OGG files, either). And despite the fact that Yahoo's music subscription service uses encrypted WMA files, just like Rhapsody, *MediaManager* won't import songs from Yahoo's service at all.

The news about video formats is decidedly better, because the ShowCenter supports both Divx 6 and VOB files ripped from a DVD, as well as DV AVI, WMV, and most other flavors of MPEG.

The interface used to browse content in your living room could be improved. The UI is not entirely intuitive, and it responds sluggishly to commands sent from the remote. The ShowCenter 200 is a big step in the right direction, but we're still a long way from having perfect video streaming in the living room.

—MICHAEL BROWN

SPECS

VIDEO OUTPUTS	Component, S-Video, composite
VIDEO FORMATS	MPEG-1, MPEG-2 (including VOB), MPEG-4 AVI, Divx (including Divx 6), Xvid, DV AVI, WMV
AUDIO OUTPUTS	Toslink, SPDIF, analog (two RCA stereo pairs)
AUDIO FORMATS	MP3, MPA, PCM WAV, WMA

PINNACLE SHOWCENTER **7**

$300, www.pinnaclesys.com

Olive Musica Wireless Music System

This audio streaming box is expensive, but worth every penny

The Olive Musica streaming box will look right at home next to the finest hi-fi gear in your rack.

We're of three minds when it comes to the Olive Musica streaming box. The audiophile in us says, "We'll pay any price for a streaming box that sounds this fabulous." The skinflint in us says, "Why pay for features our PCs already have?" And the geek in us says, "That's cool!"

The Musica has several characteristics in common with our 2005 "Gear of the Year" pick, the Sonos Digital Music System. The Musica, for example, is outfitted with not only an 802.11g wireless access point, but also a built-in four-port Ethernet switch. The Musica delivers absolutely pristine audio quality that's at least on par with the Sonos. But like the Sonos, the Musica has a few redundant features.

Where the Sonos includes a superfluous built-in amplifier, the Musica comes with not only its own 160GB hard drive, but also its own CD burner, music database, and Internet radio presets. In fact, one of the manufacturer's stated design goals is to render the server PC unnecessary.

Olive has wisely recognized, however, that 'tis better to augment a PC than to replace it with something inferior. Despite the large, high-resolution LCD, the innovative jog/shuttle controller, and the collection of buttons adorning the Musica's brushed-aluminum face, its user interface is much simpler than a mouse-driven GUI. The remote control serves its function well, but it's certainly not the best remote we've ever used.

It's inherently cool to watch the Musica suck a CD into its tray-less CD burner, and then proceed to rip the contents (you can even program it to do this without touching a single button). You can digitize analog sources, such as your collection of classic vinyl, too. Burning a CD on the spot is equally nifty. Armed with these gee-whiz features and the Musica's immaculate sound, the geek and the audiophile in us succeeded in overcoming our skinflint's objections.

—MICHAEL BROWN

SPECS

AUDIO INPUT	Analog (RCA stereo)
AUDIO OUTPUTS	Toslink, SPDIF, analog (RCA stereo), headphones
AUDIO FORMATS	AIFF, AAC, FLAC, MP3, Ogg/Vobris, WMA, WAV
EXTRAS	Built-in 160GB hard drive, 24x CD-R/16x CD-RW, USB 2.0 (2)

OLIVE MUSICA **9**

$1,100, www.olive.us

MAXIMUM PC KICKASS

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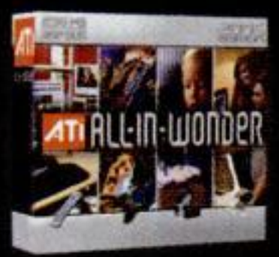

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Apple 30GB iPod

Apple goes tightwad on the latest 'Pod

Why so frugal all of a sudden? The fifth-generation iPod lacks the lavish appointments of previous models.

The iPod Nano proved Apple still has creativity to spare in its consistent reinvention of the digital audio player, but while the classic hard drive-based iPod—now in its fifth generation—takes the device to the next level with a 2.5-inch screen and support for video playback, the result feels more like a step backward.

At less than a half-inch thick, the 30GB model is almost morbidly thin (the 60GB model is slightly thicker, but still less so than the 4G iPod). It weighs 4.8 ounces, which would be barely noticeable attached to your belt, if the 5G came with a belt clip or similar carrying case, which it doesn't (you get a thin pouch instead). The 5G has the same sharp edges on the fascia as the iPod Nano, which feels less comfortable on this larger device—we'd have preferred the rounded corners of the 4G iPod instead, especially if we had to hold the player through an entire episode of *Desperate Housewives*.

The screen is dazzling even when viewed at a sharp angle—we could have been convinced we were looking at OLED technology. Surprisingly, video playback isn't limited to Apple's own H.264 QuickTime format—the 5G also supports MPEG-4 video. But there are considerable limitations to the MPEG-4 video support, which wouldn't be a big deal if *iTunes* incorporated a function to format your video to the iPod's specifications, which it doesn't.

Flipping through a very long series of photographs places demands on the hard drive, which is reflected in the battery life; we drained the battery in slightly less than two hours with frequent browsing. Continuous video playback lasted for two hours and 44 minutes, and audio playback lasted 15 hours and 22 minutes—neither of which are exceptional figures.

The iPod remains a spectacularly delicious piece of hardware, but this fifth-generation iteration, lacking a video-encoding utility, a dock, a TV-out connector, or even so much as a belt clip, feels incomplete out of the box.

—LOGAN DECKER

APPLE 30GB IPOD

8

DISPLAYS
Video playback, extremely thin formfactor, traditional iPod audio playback.

DISMAYS
No video-encoding utility, uncomfortable to hold at length, skimps on accessories.

$300, www.ipod.com

IPOD ACCESSORIES

BELKIN TUNESTAGE

Belkin's TuneStage is an unmitigated disaster. A diminutive transmitter plugged into your iPod uses Bluetooth technology to stream audio to a router-size receiver plugged into your stereo. But in our tests, the audio that emerged positively crackled with static. What utter crap. **—MB**

BELKIN TUNESTAGE 3

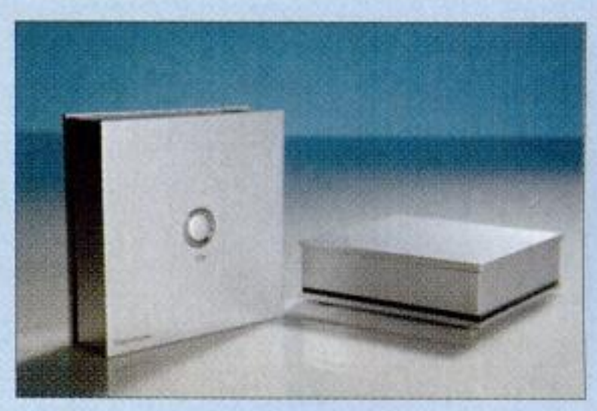
$180, www.belkin.com

ALTEC LANSING INMOTION

Here's a tiny, go-anywhere speaker system for those times when you want to share your iPod with a special someone. The inMotion delivers a pleasant-enough near-field listening experience, but distorts badly when overdriven. Runs on AC or AA batteries. **—MB**

ALTEC LANSING INMOTION 7

$150, www.alteclansing.com



STARTECH MP3 AIRLINK

StarTech's MP3 AirLink is as clumsy and ugly as Belkin's TuneStage is elegant. Unlike the TuneStage, however, the MP3 AirLink can wirelessly stream audio from any MP3 player to your stereo without infecting the signal with static—at half the price, no less! **—MB**

STARTECH MP3 AIRLINK 7

$93, www.startech.com

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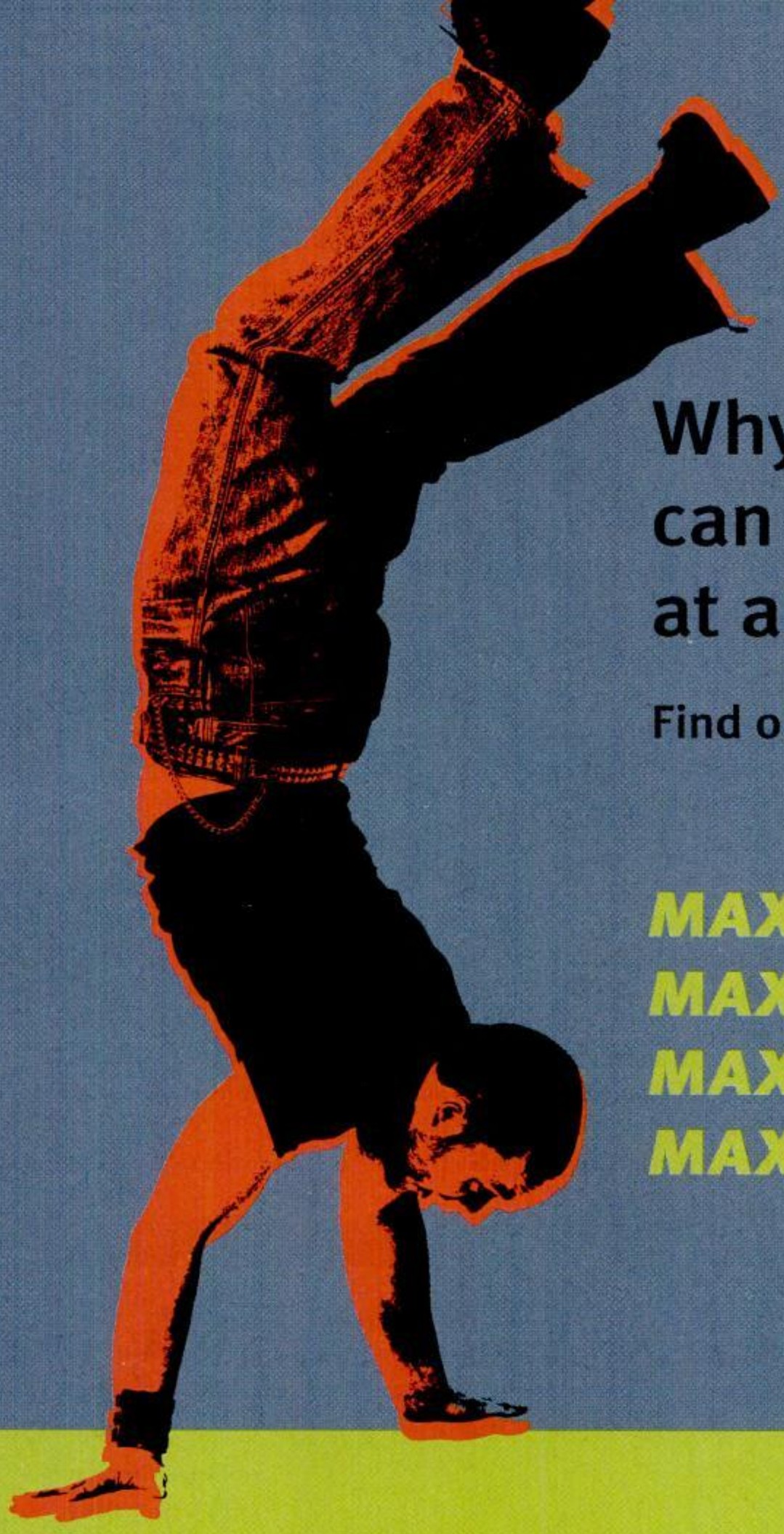

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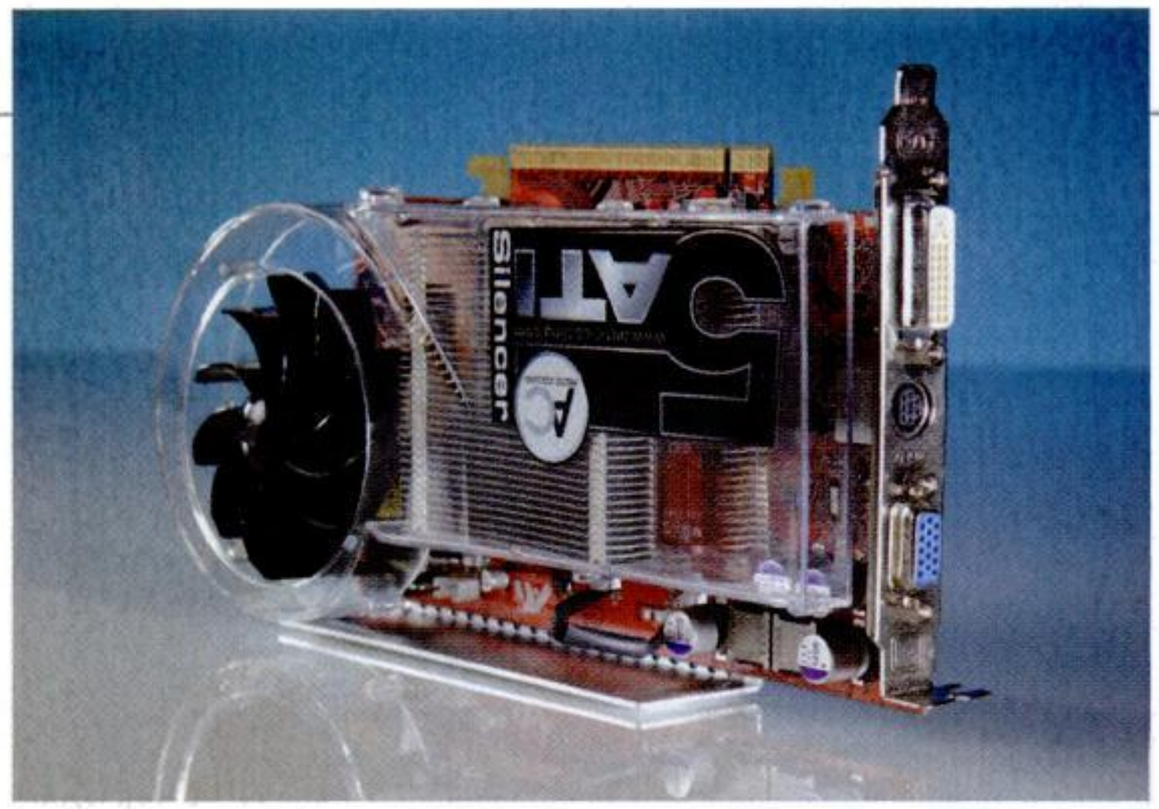
Arctic Cooling VGA Silencers

An easy way to shush your videocard

Last month we had high praise for Zalman's super-quiet VF700-CU LED VGA cooler, but this month we zero in on Arctic Cooling's extremely popular Silencer series of VGA coolers. Though only the ATI Silencer 5 is pictured, we also reviewed the NV Silencer 2 Rev. 3 for nVidia cards. Both cards live up to their name by being sinfully quiet, but the massive cooling apparatus gave us a serious hardware hangover.

Both coolers have the same construction: essentially a massive copper heatsink that bolts directly to the GPU core. Cool air is sucked from inside the case and blown by the 2100rpm fan over the heatsink and out of the case. As you can see from the image, the cooler is massive, and takes up quite a bit of space. While we didn't care that it blocked the two slots (useless PCI-E x1 slots) below the top PCI Express slot on our A8N mobo, the cooler makes it impossible to reach the release tab that most graphics-card slots sport. It also makes unplugging the six-pin PCI E power plug very difficult, as it's located beneath the shroud. As if that weren't bad enough, one of the mounting screws protrudes from the top of the unit, which prevented us from using one of our DDR RAM slots. It's a very poor design, to put it mildly.



Arctic Cooling's Silencer VGA coolers "get 'er done" with a massive copper/aluminum heatsink and a large, slow-spinning fan.

Installation was simple. Just remove the stock cooling apparatus, drop the Silencer onto the card, and secure it to the back of the board with four easily installed screws.

Once up and running, the ATI Silencer offered exceptional cooling compared with the stock cooler, while the nVidia version offered about the same cooling performance as the stock unit, but without all the noise. Our 6800 Ultra test card was irritatingly loud with the stock cooler, so the addition of the Silencer was a blessing.

Though these coolers are indeed "silent," their plus-size girth causes way too many clearance issues.

—JOSH NOREM

BENCHMARKS

	ATI STOCK	ATI SILENCER	NVIDIA STOCK	NV SILENCER
IDLE (C)	40	**29**	**47**	50
100% LOAD (C)	71	**49**	67	67

Best scores are bolded. All temperatures were measured via the card's onboard sensor using the ATI Catalyst drivers. Idle temperatures were measured after 30 minutes of inactivity and full-load temps were achieved looping 3DMark 05 for one hour.

ARCTIC VGA SILENCERS 6

$30 (ATI and nVidia), www.arctic-cooling.com

Logitech G7 Mouse

This brilliant mouse is one button shy of a perfect score

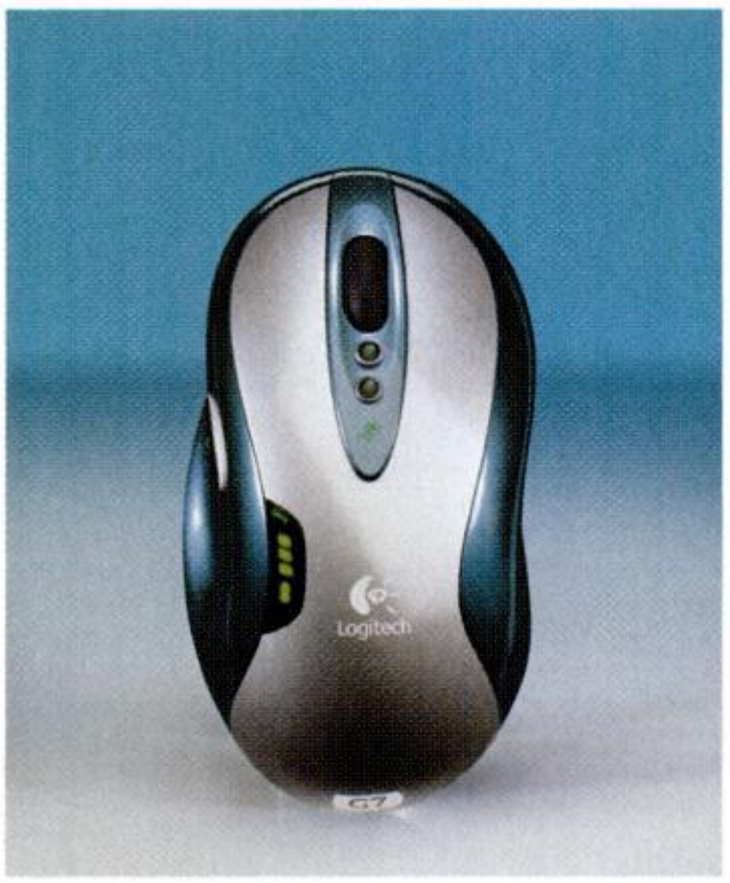
Usually, cordless mice come with built-in sacrifices: The sensor response rate is slowed to conserve battery life; the battery lasts just 20 hours; rechargeable batteries aren't included; and/or a cheap transmitter results in radio interference. The G7 is without such shortcomings—it's an unabashedly Kick Ass mouse.

Take all the features we love about the Logitech G5—an adjustable resolution sensor that allows on-the-fly sensitivity adjustments (with or without Logitech's drivers installed), a comfortable right-hand design, a 2000dpi laser sensor, four buttons, and a tilt wheel. Then cut the cord, add a removable, rechargeable battery (and USB-powered charging stand) and you've got one badass rodent.

While the G7 does drop into a low-power mode occasionally, the cursor responds immediately when you move the mouse. We were unable to detect a difference between the cordless G7 and its wired G5 sibling in any of our tests.

The G7 uses Logitech's new 2.4GHz cordless transmitter, and the difference between this and a traditional cordless mouse is immediately obvious. In our casual testing, the G7's range easily exceeded 20 feet. We're not sure why you'd need 20 feet of range on a mouse, but we'll take it. If nothing else, the insane range should guarantee perfect coverage near your desk.

The G7 also includes the same sensitivity meter as the G5, but on the G7 it doubles as a battery-status meter. If you don't use the mouse for a few moments, the orange sensitivity LEDs fade, and green battery-status LEDs light up. It's a subtle, but very nice touch.



Shiny where others are matte, the Logitech G7 delivers the same performance as its wired sibling, with cordless convenience.

The G7 comes with two batteries, a thumb drive-size transmitter, and a USB-powered charging station that also sports a single USB port.

Our only real complaint with this mouse is the same complaint we have with its wired sibling. We'd really like to have a second thumb button available. Two thumb buttons is fairly standard! Still, even lacking a second thumb button, this is the best cordless mouse money can buy.

—WILL SMITH

LOGITECH G7 MOUSE 9

$100, www.logitech.com

MAXIMUM PC KICKASS

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Extreme Power

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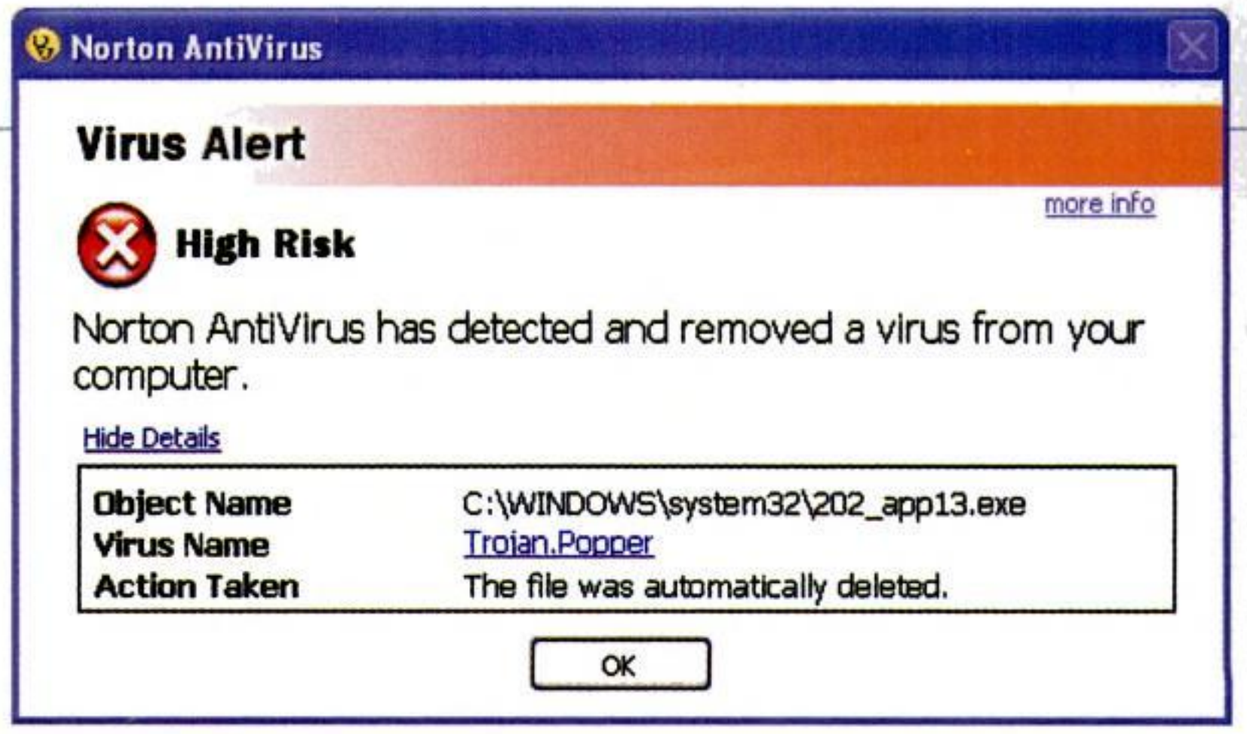
Antivirus Arm Wrestle

Symantec or McAfee—who yields the better shield?

Viruses. Worms. Trojans. Bummer. But that's life: The best things, including drag racing, sex, and the Internet, aren't without their dangers. That's why we've got airbags, condoms, and antivirus applications. You're on your own with the first two, but *Maximum PC* put its rigs on the line to suss out the software that lets you surf, download, and email with confidence.

—LOGAN DECKER



Although most intruders are halted at the gate, *Norton* requires a visit to the Symantec website to remove the most tenacious viruses and worms.

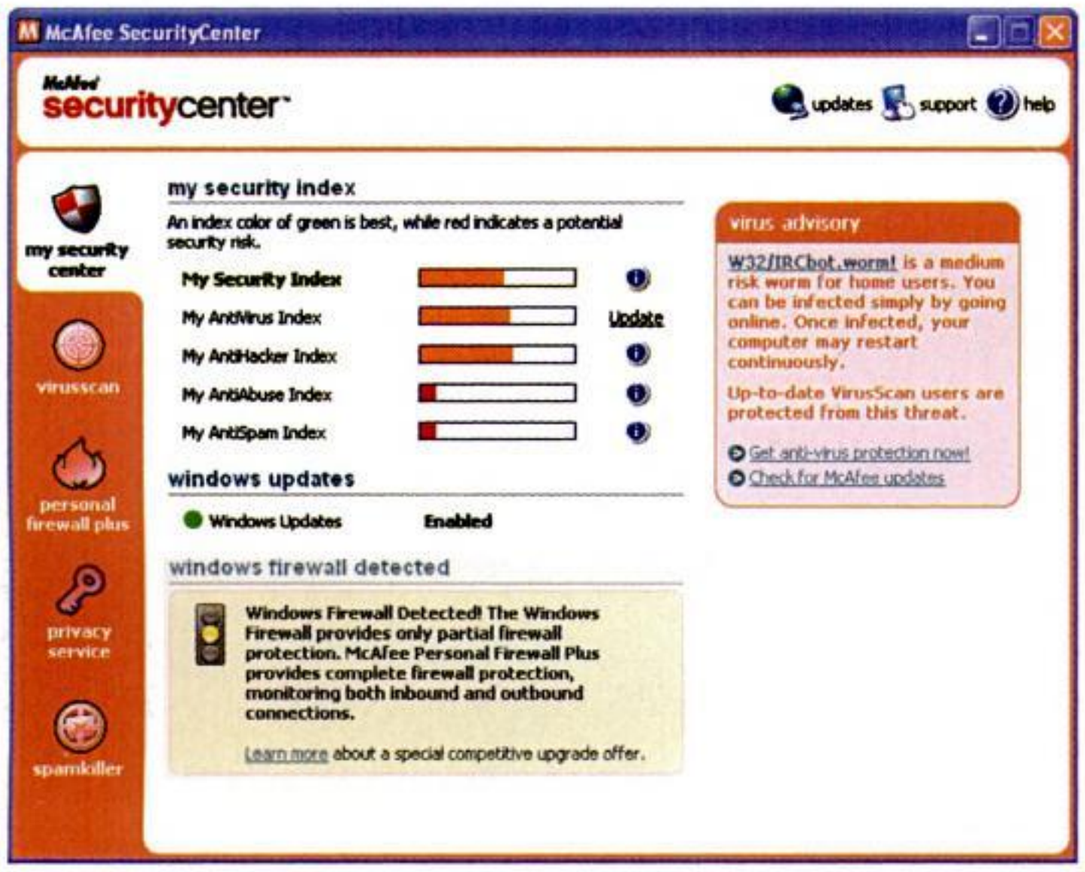
MCAFEE VIRUSSCAN 2006

Forty bucks buys you antivirus protection, email-attachment scanning, spyware detection, real-time, on-the-fly security alerts, and one year of daily virus-signature and program updates in McAfee's *VirusScan 2006*. This includes monitoring your system for suspicious activity, such as behaviors indicative of worm and hostile-script activity.

After a swift and painless installation (unfortunately, registration is required to receive program updates), *VirusScan* completed its survey of our test system in a somewhat sluggish 41 minutes. But up against Maximum PC's Payload of Misfortune™—a bundle of 12 viruses, worms, downloaders, and Trojans—McAfee nailed the lot of them. It also detected the two spyware spooks, but was only able to remove one of them on its own.

One of the highlights of McAfee *VirusScan 2006* is protection from what McAfee calls PUPs—potentially unwanted programs. It's very effective. We installed the application first and then busted out with our payload again, and *VirusScan 2006* flagged all of our Internet cooties and blocked their installation. On the other hand, it also proved to be a bit on the hysterical side, frequently sounding the alarm on game and application demos, and even PUPs we had previously authorized.

We're delighted to report that McAfee's *VirusScan 2006* is a competent Internet cootie blocker, but even in this respect, it's still playing catch-up with Symantec's somewhat more sophisticated and comprehensive application, and it still doesn't stand out as a great value compared with free antivirus and anti-spyware mercenaries like *AVG* and *Spybot*.


McAfee SecurityCenter
securitycenter
updates
support
help
my security center
my security index
An index color of green is best, while red indicates a potential security risk.
My Security Index
My AntiVirus Index
Update
My AntiHacker Index
My AntiAbuse Index
My AntiSpam Index
virus advisory
W32/IRCbot.worm! is a medium risk worm for home users. You can be infected simply by going online. Once infected, your computer may restart continuously.
Up-to-date VirusScan users are protected from this threat.
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Windows Updates Enabled
personal firewall plus
windows firewall detected
Windows Firewall Detected! The Windows Firewall provides only partial firewall protection. McAfee Personal Firewall Plus provides complete firewall protection, monitoring both inbound and outbound connections.
privacy service
Learn more about a special competitive upgrade offer.
spamkiller

It's very annoying that those yellow and red bars in the SecurityCenter just indicate that you haven't purchased other McAfee utilities.

MCAFEE VIRUSSCAN 2006

HUGS
Effective protection against Internet nasties.

BUGS
Redundant PUP alerts; frequent reboots required.

6

$40, www.mcafee.com

SYMANTEC NORTON ANTIVIRUS 2006

Like McAfee's *VirusScan 2006*, *Norton AntiVirus 2006* installed without undue agony, and a relatively swift 28-minute initial scan alerted us to all 12 of the Payload of Misfortune™ rogues. Purging unwelcome spyware guests proved to be a challenge, however, as both pieces of spyware had to be removed manually with help from the Symantec website.

NAV 2006 also monitors email attachments, keeps an eye out for spyware and unauthorized installations, and can be configured to update itself automatically, just like McAfee's app. But *NAV 2006* shows more polish and foresight than *VirusScan* before you even install the application. The installation disc is bootable, giving you a clean environment to start with if you've got a serious problem on your hands; McAfee's *VirusScan 2006*, on the other hand, requires you to make rescue discs instead. And *Norton's* real-time PC cop guarding our test system was far less jumpy than the one offered by *VirusScan 2006*, alerting us only when we had a genuine ITD (Internet transmitted disease). *AntiVirus 2006* also required fewer reboots throughout our test period, and offers browser hijack protection, a curious omission in its competitor. The clincher is that, on top of all this, *Norton AntiVirus 2006* is lighter on CPU and memory usage than *VirusScan*.

We could have done without the Security Center, which, as in McAfee's product, is just an advertisement for other products; and more effective removal tactics would be welcome. But hey, that's something to look forward to in 2007.

NORTON ANTIVIRUS 2006

HUGS
Bootable disc, browser hijack protection, keen eye for viruses and worms.

THUGS
Failed to successfully remove some infections, annoying Security Center.

7

$40, www.symantec.com

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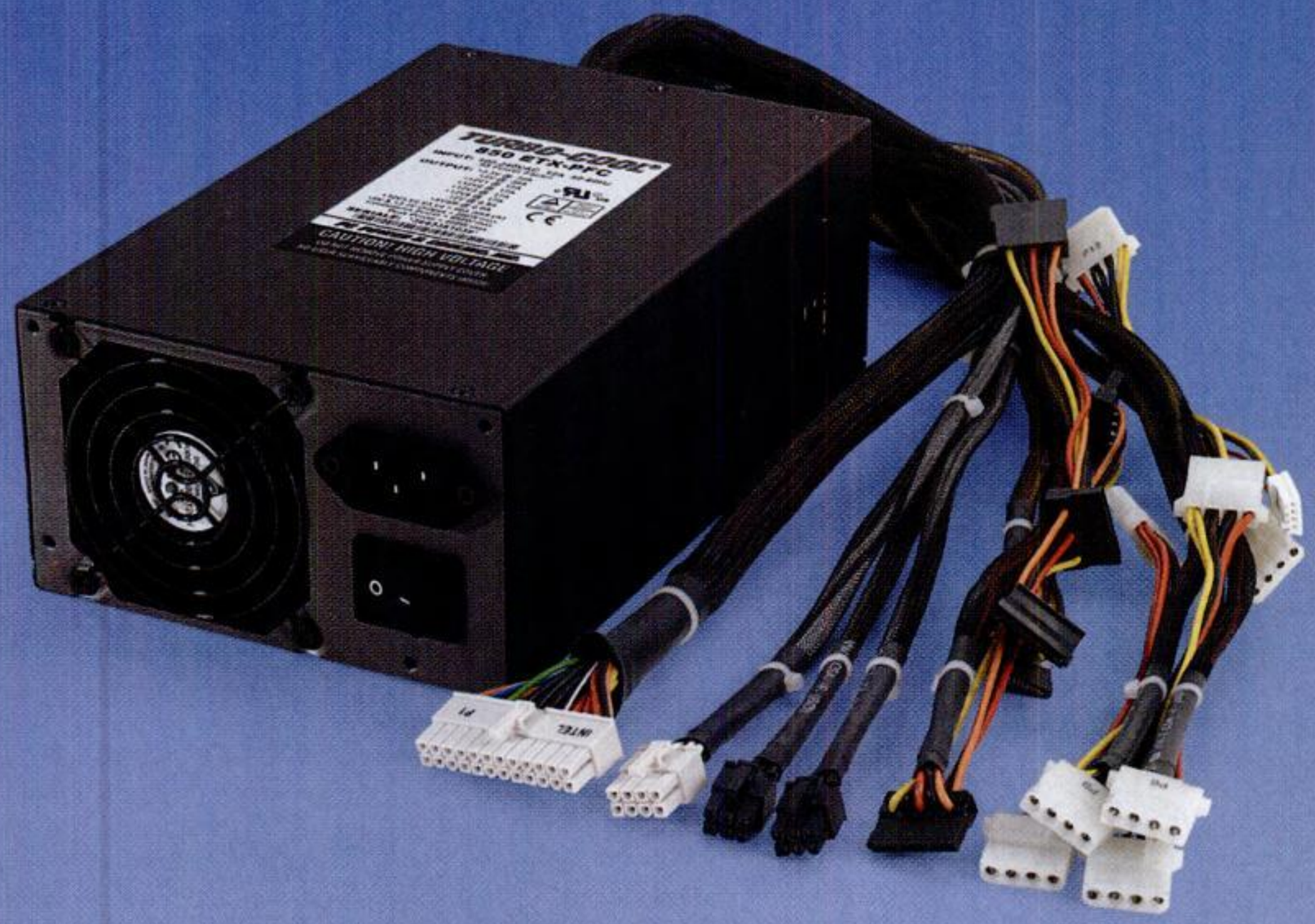

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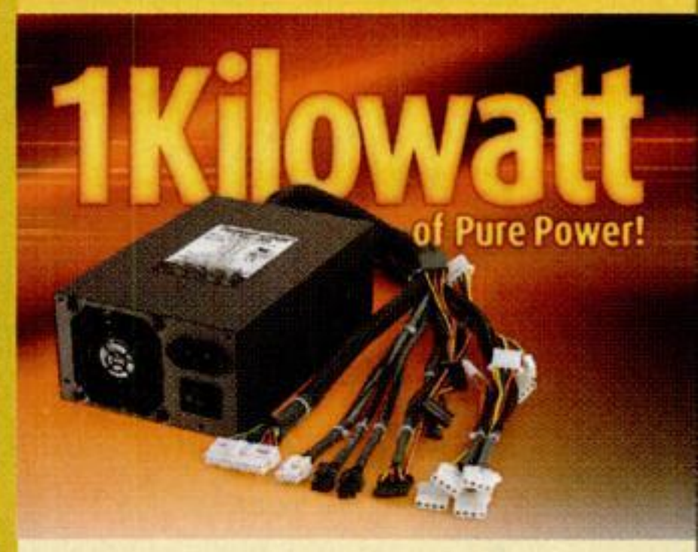

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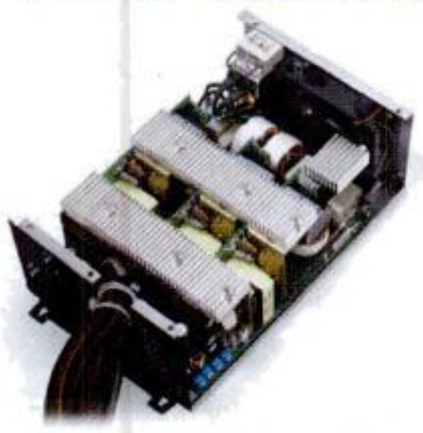

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Age of Empires III

Aka "AOE II with Better Graphics"

If you are relatively new to strategy gaming and you're a history buff, *Age of Empires III* is a no-brainer: It's just about the most gorgeous period RTS you're going to find, and its rock-solid gameplay will haunt your waking hours. If you've been around the RTS block a few times, however—specifically Ensemble Studios' block, with *AOE I* and *II*—you're likely to be a bit disappointed with this latest installment.

The game tracks the exploits of the Black family as it explores the New World over a period of 200 years. It begins with Maltese knight Morgan Black in the 17th century, picks up 100 years later with Black's explorer grandson, and wraps up with the spotlight on Black's great-great granddaughter in the Industrial Age. Essentially, you trade in the swords and pageantry of *Age of Kings* for muskets, cannons, and mortars.

The story, told *Warcraft III*-style, features in-game cinematics before and after missions. Hero characters lead troops in battle and gain experience points that can be spent on valuable resources down the road. The gameplay is of the "if it's not broke, don't fix it" variety: little has changed since *AOE II*. Heck, even the AI feels the same. It's challenging at times, but a bit anemic overall: The AI tends to churn out a few units at a time to harass you, rather than mustering its forces for concentrated, tactical strikes.

There are some surface-level tweaks, such as caches of loot that are scattered about maps that you can "liberate" from their guardians for the good of the home team. And stone has been eliminated as a resource, leaving just wood, gold, and food to gather. (The need to construct resource drop-off points has also been axed, thankfully.)

The settings and units might have changed, but the razing is the same.... This scene should conjure up some déjà vu for *AOE* vets.

By far the most prominent addition is the somewhat over-hyped Home City, which acts as a support network throughout the entire campaign. Your success in a given mission translates into power for your Home City, which in turn translates into upgrades and resources you can call in during the next mission. These boons come in the form of playing cards you can use for a quick boost to a vital resource, such as wood, a squad of musketeers, or a cannon. And you can upgrade the looks of your Home City, changing the appearance of buildings and the types of people who inhabit it.

While the introduction of *Magic the Gathering*-style mechanics into an RTS is novel, it doesn't feel like the Home City element has a major impact on the core single-player game. Typically, you still need to build up your army and bases between missions, and you can't carry your units over from one map to the next. The Home City does have an impact on multiplayer, however, as it introduces a major wild card into the mix.

Graphically, there are no nits to pick: *AOE III* is easily the most resplendent and detailed RTS we've seen yet. Zoom in on the action and you'll continually see new animations and unit interactions that amaze. *AOE III* is also the first RTS to implement the Havoc physics engine, which translates into eye-popping building explosions and units getting tossed about like rag dolls by cannonball explosions. Glorious—particularly if you've got a widescreen monitor and the PC muscle to push the pixels.

The Home City gives consistent support through each Act, and much needed resources in missions, but it really doesn't alter the core gameplay much.

Backed by one of the best pedigrees in the genre, *AOE III* features ultra-refined gameplay, balanced units, impressive use of rag-doll physics, and an interesting narrative. Unfortunately, other than the extraordinary graphical makeover, *AOE III* plays like a rewarmed *AOE II*, or any other top RTS these days. We would have liked to see as much attention focused on implementing new, innovative gameplay features as was obviously focused on technical bells and whistles.

—STEVE KLETT

AGE OF EMPIRES III

BOSTON TEA PARTY
Awesome visuals, strong story, deep single-player campaign.

ENGLISH TEA PARTY
Core gameplay is very similar to *AOE II*, repetitive missions, and ho-hum AI.

8

$50, www.ageofempires.com, ESRB: T

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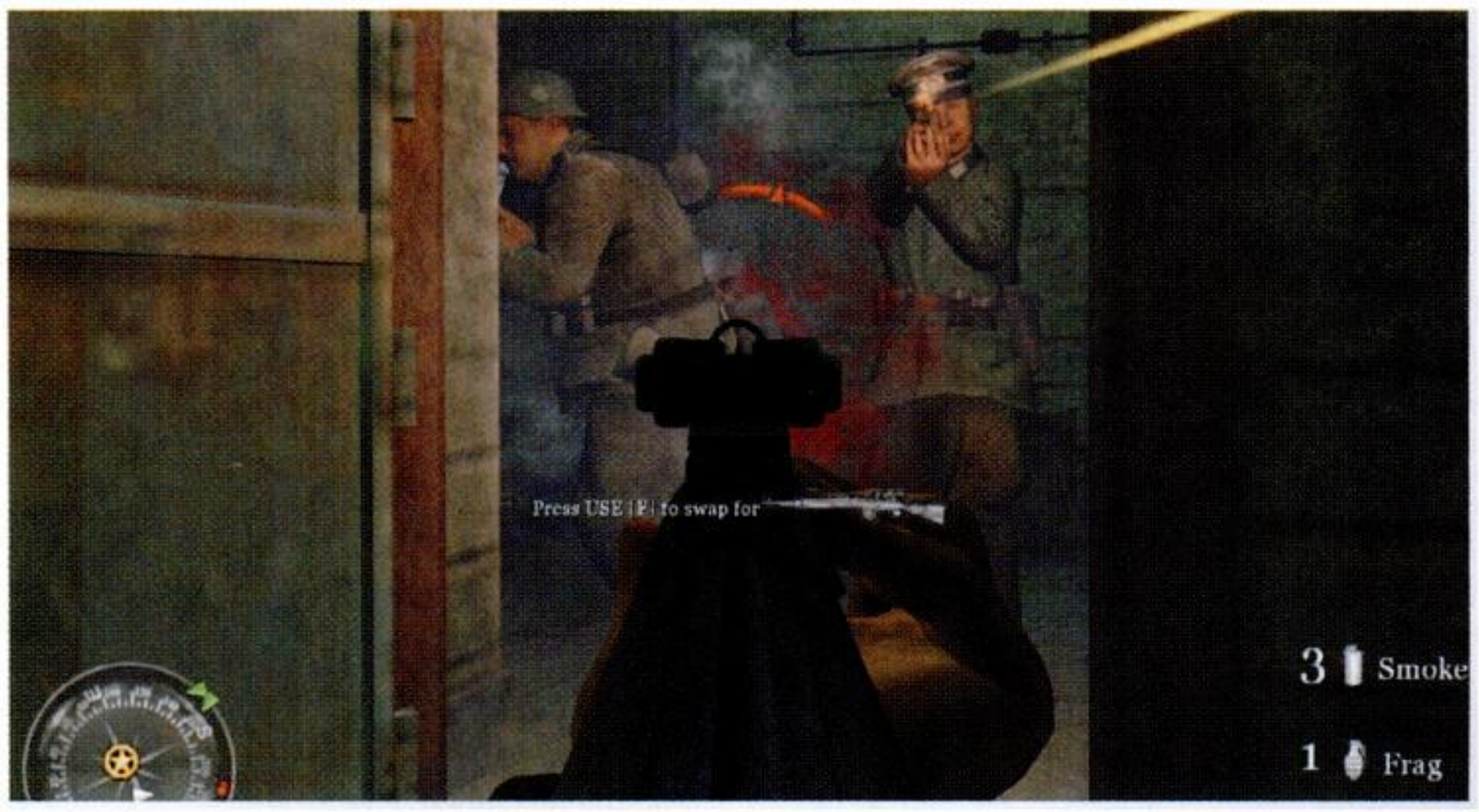

Mom and Dad: Here are the Germans, or "Krauts" as we call them. Our British pals call them "Jerries."

Dear Mom and Dad, You're probably looking at the address on this letter and wondering, "What is Johnny doing back in Belgium?" Well, you're not going to believe it. I got stop-lossed and am now on my second tour in the war against fascism! What a bunch of hooey! The bullet I took in the buttocks in Bourgogne last year hasn't even healed yet, so I have to sit on one of those inflatable donuts whenever I ride in a jeep or truck. You wouldn't believe what the guys have to say about that!

I'm back with my team and we're kicking ass all over the European continent, and beyond. So far we've been to Belgium and the Netherlands, into Germany, and we even had a few missions in Egypt against Rommel's tank divisions. Boy do those tankers have it easy! I know I'm not trained as a tank operator, but I sure gave it to those Krauts! I destroyed an entire tank division by myself and that was when I could barely reach the tank's pedals because of the doggone donut.

Killing Germans can get pretty monotonous, but our killing has covered a wide variety of terrain in this tour. Still, we're mostly running through bombed out towns, clearing houses one by one. This tour, my new Sarge lets us clear the houses in any order; he's much better than the hard-ass that always forced us to do everything in a particular order—no wonder he got fragged!

Aside from this small change in SOP (that's standard operating procedure), the combat is just like my last tour. The Germans just don't have many surprises left. I guess someone finally invented a smoke grenade that Uncle Sam can afford, so we get to use those on the battlefield now. They come in real handy when trying to flank a blazing MG42.

Probably the biggest difference this time around is how much more intense everything feels and sounds while we're "in the sh*t," so to speak (sorry, Mom, but that's how we talk here). Once the first round is fired, all hell breaks loose. Now, I know I said that about my first tour, but I *really* mean it this time. Once the shooting starts everything around us erupts. We're screaming at the Krauts, the Krauts are screaming at us, people are getting torn limb from limb and screaming about that, and there are explosions going off all around us and gunfire rattling in our ears. It's enough to make a grown man soil his skivvies.

So like I said, Mom and Dad, this tour is a lot like the first one, but this time the action seems extreme. Sure, once in a while we're doing boring missions, and it gets tiring continually clearing houses (and why do all the houses have the exact same interiors?), but luckily there's enough "new" stuff for our squad to do on this tour to make it fun. That said, I can't wait to come home. I won't be re-enlisting, that's for sure. I figure if they try to stop-loss me again I'll just ask my CO to the next USO ball.

—JOHNNY "JOSH NOREM" JOHNSON

In my second tour we no longer have to collect canteens full of "health." This time we just fight until our vision gets all red, and then we have to take a break, otherwise we pass out and have to start over.

Check out this German I killed. After I shot him, his helmet came flying off, he dropped his rifle, and got knocked back about 10 feet. Suck it down, sausage eater!

CALL OF DUTY 2

C-RATIONS

Visceral combat, decent visuals, nonstop action, and ragdoll physics.

C-SECTIONS

Not a lot of variety in missions; too much like *CoD1*.

9

$50, www.callofduty2.com, ESRB: T

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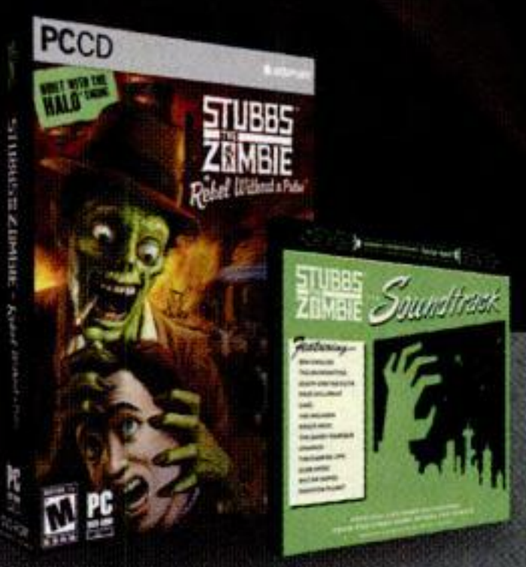

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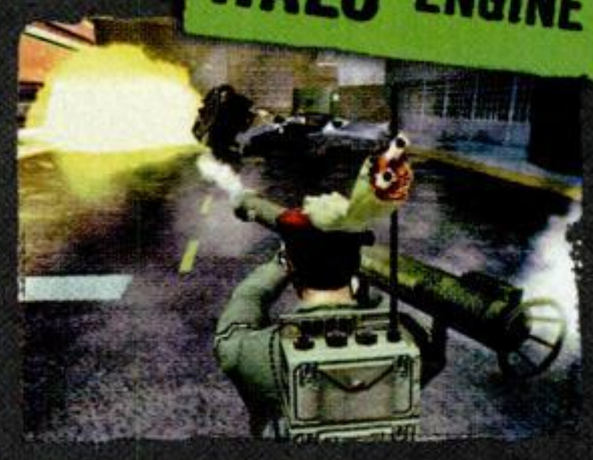

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F.E.A.R.

A decent shooter with some real mommy issues

***FEAR* might have the best AI we've ever seen in a game, but you'll still find an occasional baddie who's just hanging around.**

With *FEAR*, Monolith has cooked up another technically proficient shooter that just can't maintain the pace it sets for itself in its early levels. What starts out as an intensely creepy, J-horror romp through an abandoned industrial wasteland populated by the smartest enemies we've ever fought finishes exactly the same way. This might seem like a good thing, but realize there's virtually no variation through the entire game.

Some would probably argue that the enemy AI is so good, you don't really need variation. That the mere joy of fighting clever enemies who behave more like real-life humans than the idiotic drones common to first-person shooters, is reward enough. We'd probably agree if there were more than six basic types of enemies in the game. Sure, fighting soldiers that try to flank you, provide cover to their buddies, and make decent tactical decisions is refreshing, but after eight hours of battling the exact same opponents, in a perfectly linear environment, it's tough to remain enthusiastic.

Unfortunately, the actual firefights are few and far between. A typical sequence goes something like this: You travel through industrial-looking tunnels for five to 10 minutes, absorbing the mostly repetitive architecture. Enjoy a brief respite while the game autosaves—the game freezes for two or three seconds every time you save—and brace yourself for the inevitable intense fire-

Your enemies are particularly nimble, they can jump over many railings that you can't even climb over!

fight that awaits you just around the corner. We love the suspense that builds as you run through the tunnels, waiting for the next fight. We love the autosaves, which keep us from wasting hours traversing the same empty corridors over and over. But we absolutely *hate* that the autosave pause telegraphs an upcoming firefight with 100 percent accuracy, utterly destroying the suspense built during the 10 minutes since the last fight. It's amazing how something so small as a two-second hitch can affect the game in such a big (and bad) way.

Explosions affect everything in the environment, including the corpses of your deceased enemies.

Weapons are good, but are difficult to use if you don't enable the game's bullet-time slow-mo effect. On the other hand, if you use bullet-time frequently, the game is very easy, even at the higher difficulty settings. It quickly becomes more about managing bullet-time rather than killing baddies.

Monolith did a great job with both the in-game sounds and the soundtrack. The spooky audio makes exploring deserted ruins creepy, and the positional sound works to great effect; sinister noises like breaking bottles and creaking metal come from your rear channels with just the right frequency to freak you out.

From a technological standpoint, *FEAR* uses the most advanced version of the Lithtech engine we've seen. With support for volumetric fog, soft shadows, normal maps, and real-time lighting, the game looks spectacular. Hell, you can even see your feet! All the usual physics gimmicks are present, and the enemy deaths, courtesy of the ragdoll physics system, are always entertaining. *FEAR* runs moderately well on last-gen hardware, but to really see this game at its best, you're going to need a high-end CPU, a gig or more of memory, and a current-gen videocard (or two), so you can crank up the detail.

The team deathmatch mode with bullet-time enabled is a must for multiplayer aficionados. When bullet-time activates, everyone on your team gets the bonus, not just a single player. This creates frequent, exciting shifts in an already high-speed, almost frantic multiplayer scenario.

—WILL SMITH

F.E.A.R.

+ J-POP

Unbelievable AI, fun firefights, great graphics, and immersive sound.

− J-HORROR

Lame autosave pauses, repetitive and linear level design, uninspired enemy design.

8

$50, www.whatisfear.com, ESRB: M

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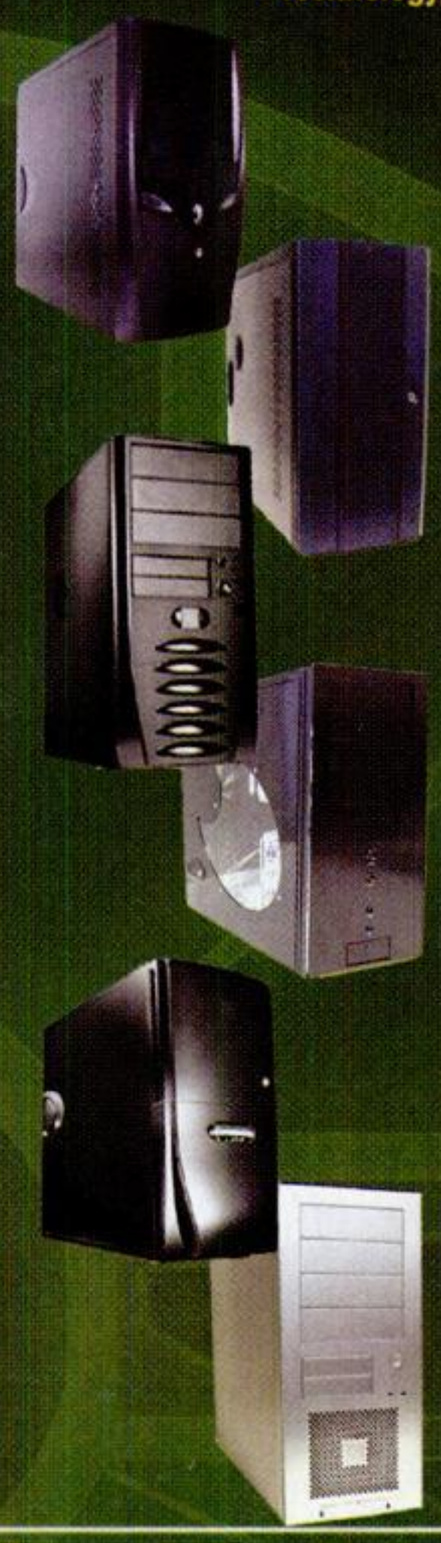

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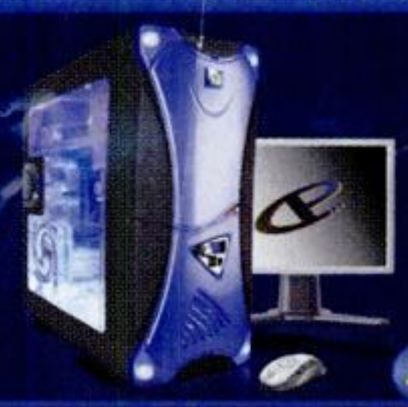

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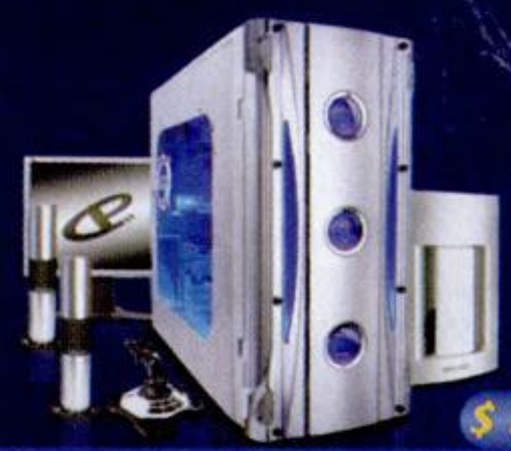

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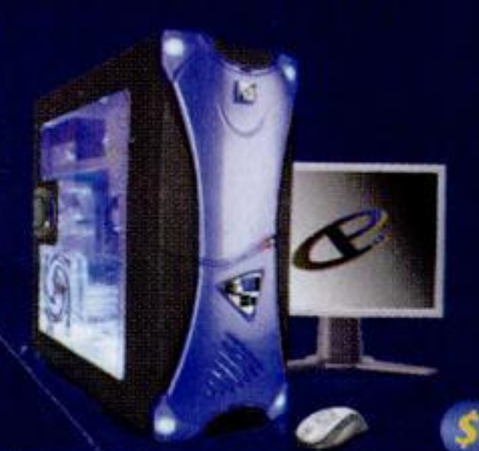

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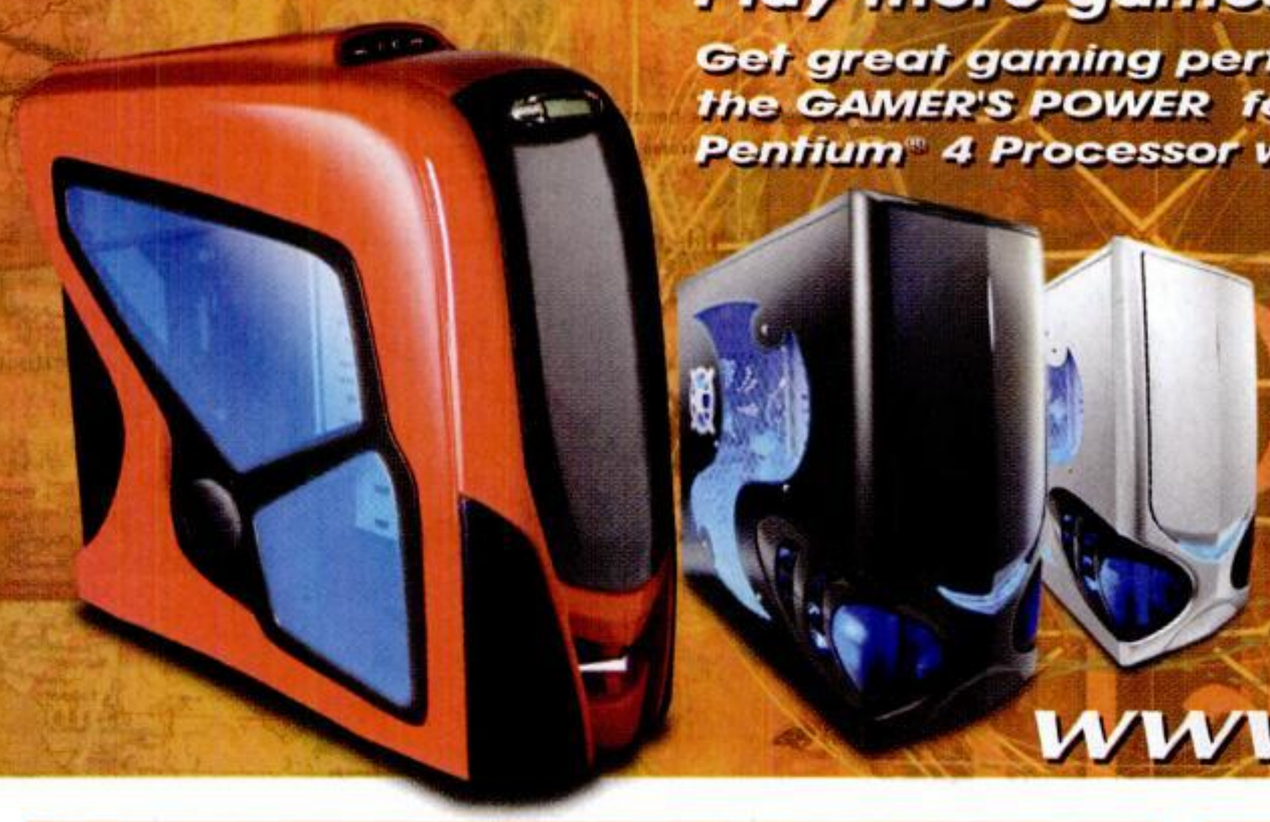

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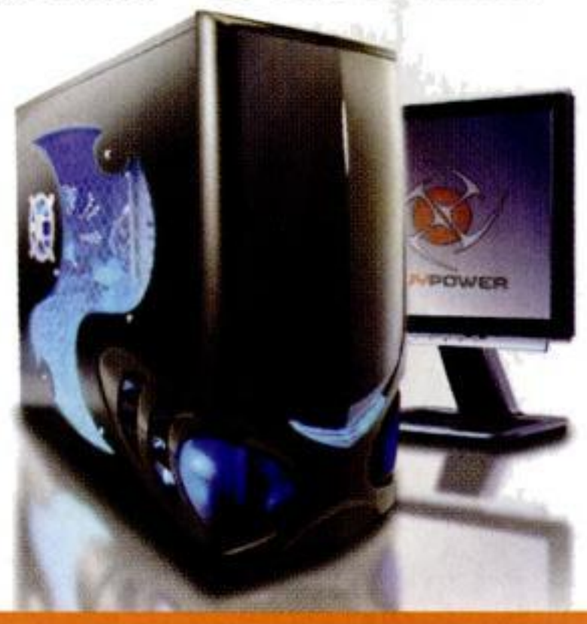

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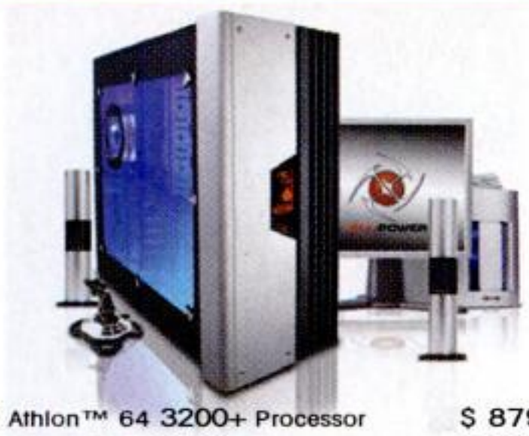

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8. I will ~~read~~ the manual just as soon as I can find it.
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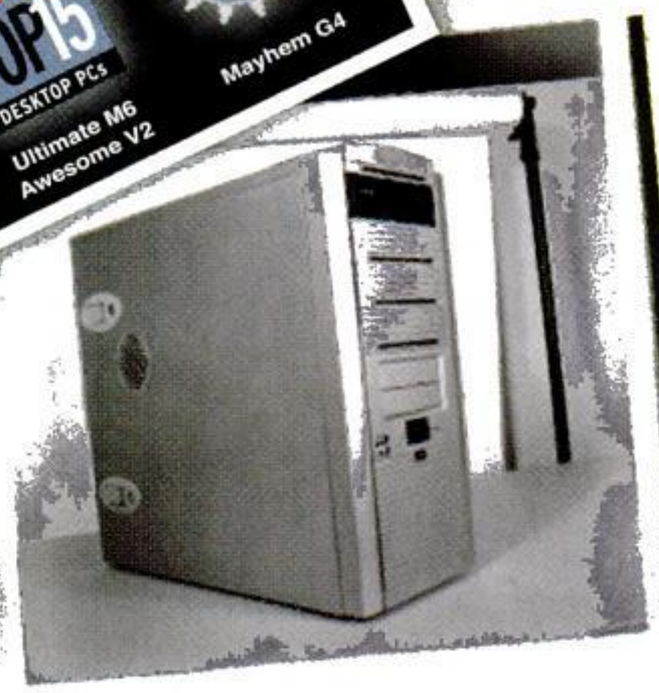

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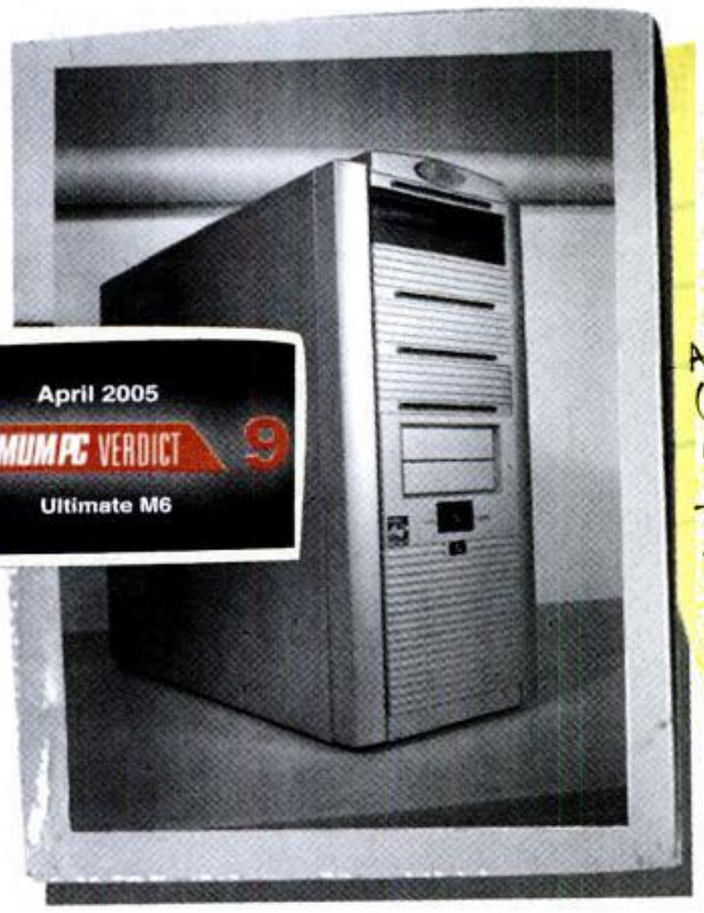

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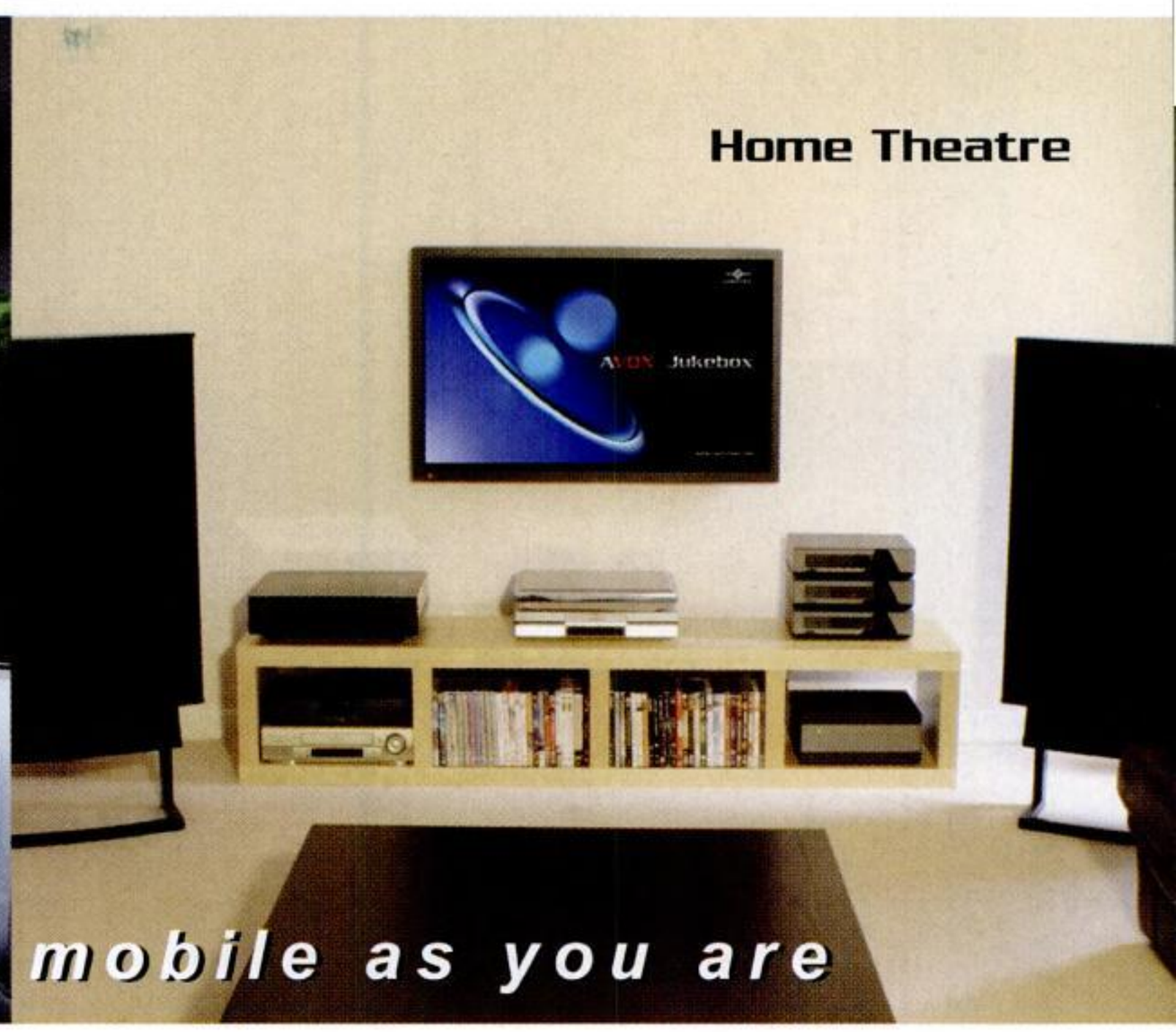

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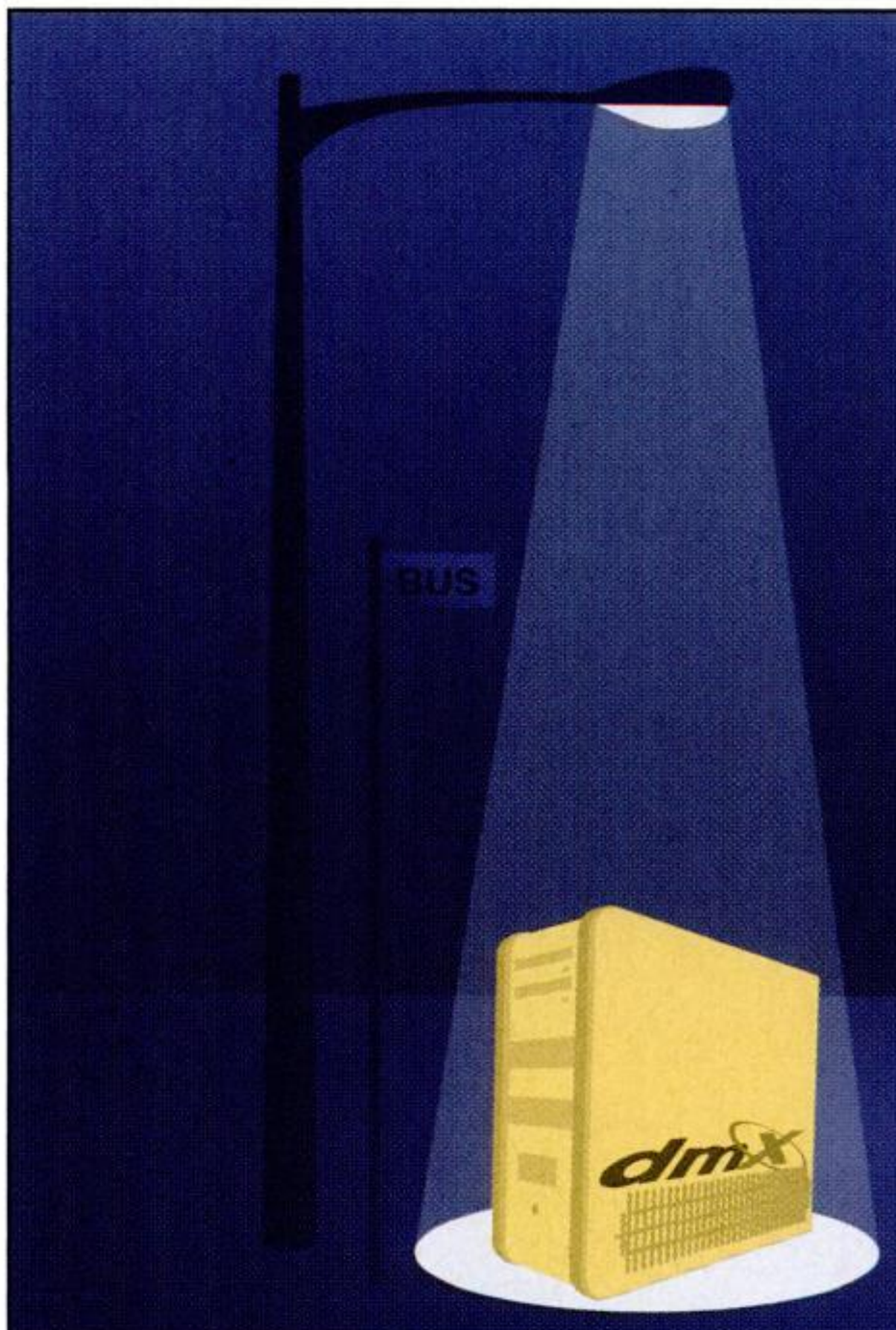

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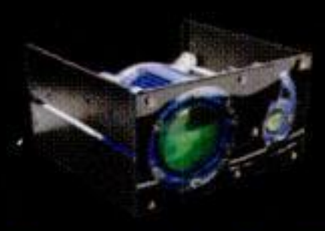

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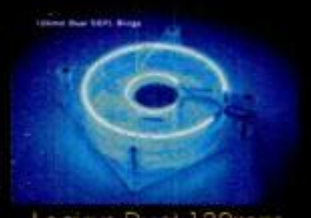

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We tackle tough reader letters on...

✓Digicam Testing ✓AMD64 Extensions ✓LaCie's Silverscreen ✓Creative's X-Fi

INTEL GIVING UP?

I arrived home this evening to find the November 2005 issue waiting patiently for me in my mailbox. I made myself a cup of coffee, and settled in to read. I check out the article on page 10, entitled "Goodbye Pentium 4." Then I looked at the chart on the lower left-hand corner of the page, "Intel CPUs Compared." I nearly did a spit-take when I saw the specs for the "Next-Gen CPU."

The specs, under Advanced Features, are listed as "SSE, SSE2, SSE3, Dual Core, Vanderpool Technology, Intel Advanced Management Technology, and AMD64"!

Is this a typo, or has Intel thrown in the towel? Inquiring minds want to know!

—Bobby Sledge

SENIOR EDITOR GORDON MAH UNG RESPONDS: We're assuming you're shocked that Intel would adopt an AMD technology in its CPUs, but that's exactly what the company has done. Intel, however, calls the AMD64 extensions "Intel Extended Memory 64 Technology," or EM64T. The only reason we can see not to call the AMD64 extensions by their real name is to save face. This would be roughly akin to AMD adding SSE3, which was created by Intel, and calling it something nutty, like Super Sonic Extreme 4 Instructions. We actually preferred it when the 64-bit extensions were just called x86-64.

LACIE AIN'T LAKICKASS

While your review of the LaCie 40GB Silverscreen external drive in the Holiday 2005 issue seems accurate, I disagree with your decision to give it a Kick Ass rating. The Silverscreen omits several features that I personally would have found very appealing. I saw no mention of a digital output such as HDMI or DVI. The device does not support FireWire or SATA for data transfer. Furthermore, the 80GB model is only $50 more expensive yet offers double the capacity and an 8MB buffer (although it's still just a 5400rpm drive).

I just feel that a verdict of 9/Kick Ass seems a bit high for a device that could be much better than it is.

—Bryan Kazdan

FEATURES EDITOR LOGAN DECKER RESPONDS: When I review a product, I begin with an assessment of what it's trying to do. Generally speaking, the verdict will primarily depend on how well a product meets that objective and the overall value of that objective—everything else is gravy. LaCie is pushing the Silverscreen as a portable media center, and in that capacity, the Silverscreen is about as ass-kicking as ass-kicking gets. It's the *only* media playback device we've ever tested that played *every single one* of our test videos (with the exception of Divx 6 media, which is a fairly new format). No disappointments, no unexpected hassles, no hysterical error messages, just *Pretty Woman, Dead Alive,* and *Piranhas 2.* Or whatever you're into.

I agree that the 80GB model is a better value, but we review the products sent to us as is. We encourage manufacturers to send us their biggest, best, and baddest, but what lands on our desk is what gets put to the test.

DAMN YOU, DRIVER UPDATES!

In your Holiday 2005 issue comparison of SLI and CrossFire, you gave CrossFire kudos on flexibility, citing that CrossFire can use cards from different manufacturers and with different clock speeds, while SLI cards have to be identical and from the same manufacturer with the same BIOS. While CrossFire does have it over SLI on the clock-speed and different-card-use elements, it's not true that SLI cards must be identical. You can run cards from different manufacturers as long as they both use the same reference design. They also have to be of the same type (e.g., both 7800 GTX boards), and you have to be using the nVidia drivers, not vendor-specific drivers for both cards.

I have an XFX GeForce 7800 GTX and an EVGA GeForce 7800 GTX running in SLI and it works flawlessly, delivering outstanding performance with no

Testing Cameras the Maximum PC Way

I'm sorry to say this but the camera reviews in the Holiday 2005 issue, especially of the Sony DSC-T7 were very poorly done. No objective criteria were used whatsoever, and if you look at any objective review comparing color quality, resolution, etc. the DSC-T7 will outperform the Casio Exilim, which you rated higher. Just eyeballing a few test shots isn't a good camera review.

If you're going to review cameras, use objective criteria for resolution and color accuracy.

—Nick Dolezal

SPECIALS EDITOR STEVE KLETT RESPONDS: Rest assured much more went into these reviews than you suggest. Each camera's image quality was tested at its maximum resolutions across a range of lighting situations. Battery life and usability, which is admittedly much more subjective, were also major considerations. In the end, we didn't feel the T7's higher price was justified given the competition's similar performance.

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problems, so it can be done. Some cards may not play nice with others, but I can attest by experience that at the very least the EVGA and XFX cards work together wonderfully.

—B.J. Koho

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: The print media has its advantages, but timeliness often isn't one of them. At the time it was written, our CrossFire vs. SLI Head2Head accurately stated that ATI's dual-videocard solution enabled users to mix videocard pairs, and that nVidia's solution did not. The situation changed after we went to press, when nVidia released its Forceware version 81.85 drivers on October 20. As long as you're running that driver, you can mix and match videocards from different nVidia partners, if each card is based on the same GPU. But this begs the question of nVidia: If all it took to enable this feature was a driver update, why was the restriction there in the first place?

MORE 64-BIT WINDOWS WOES

I really wish you had included the fact that the Creative X-Fi soundcard isn't compatible with the 64-bit edition of Windows XP Pro in the review of that soundcard (November 2005).

I contacted Creative Labs and was told a patch would be available by January 2006. Honestly, I spent $400 Canadian on a Fatal1ty card that I can't even use. I even bought new speakers to go with it, for another big chunk of change. I built my own Dream Machine and now I can't use it to its potential, which sucks.

Please think of 64-bit users in the future when you're writing reviews. Don't worry though, I still love you guys.

— Neo Tsunami

SENIOR EDITOR GORDON MAH UNG RESPONDS: The X-Fi isn't incompatible with Windows XP Professional x64 Edition—the drivers just aren't very solid yet. Today Creative just released an updated driver for 64-bit Windows. We normally only review products using the most popular version of the OS, namely Windows XP Pro 32-bit edition. We just don't see enough people using x64 Edition, Linux, or older versions of Windows to make it worth the extra time it would take to test multiple OSes. We also recommended that x64 users dual boot to account for the lack of drivers for x64. And we still love you too, Neo.

WHERE DOES THE RAPTOR FALL?

In your recent reviews of next-gen hard drives, you continually state that the WD Raptor has seen its last days and that people would be better served with a higher-capacity hard drive. I disagree.

The Raptor has one feature that none of the other drives have—10,000rpm spindle speed! When you actually compare benchmarks you see that the Raptor can still kick some 7200rpm ass. The only advantage the new drives have over the Raptor are capacity and buffer size. Secondly, the Raptor is not designed to be a mass storage drive. I keep my movies and music on a second, high-capacity hard drive, as all people should. With the Raptor performing significantly better than any 7200rpm drive in most benchmarks, it seems a lot more tempting than your reviews seem to state.

—Andy Gifft

SENIOR EDITOR JOSH NOREM RESPONDS: This is a great question, Andy, and you're not the first Raptor-owner to write in voicing your disapproval of our sudden change of heart towards our old flame, the WD Raptor. The truth is, for the record, the WD Raptor is still the fastest single drive on the market, hands down. We won't deny that its seek times destroy those of its 7200rpm competitors, and that its average transfer rates are also better. It's the clear winner when it comes to straight-up performance, but despite this advantage, there are still several reasons why we prefer high-capacity 7200rpm drives to the speedier, smaller Raptor.

First, the new-generation 7200rpm drives have a massive areal density advantage over the Raptor, as well as buffers that are twice as large. These advantages allow them to perform at a level that is just slightly below the Raptor, while boasting capacities up to 500GB (compared with the Raptor's 74GB). In our benchmarks, the Raptor is only faster than these next-gen drives by the smallest of margins, and some 7200rpm drives have even surpassed the Raptor in our Application Index benchmark too. Because these drives are, for our purposes, just as fast if not faster than the Raptor, and have enormous storage capacities, they are inherently superior to the Raptor, in our opinion. Especially considering the Raptor costs almost $200, which is the same price as WD's new Caviar SE16 400GB drive. If it were our money, we'd take the Caviar drive over the Raptor any day. MPC

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CHRIS CARDINALE'S

RX-8 PC

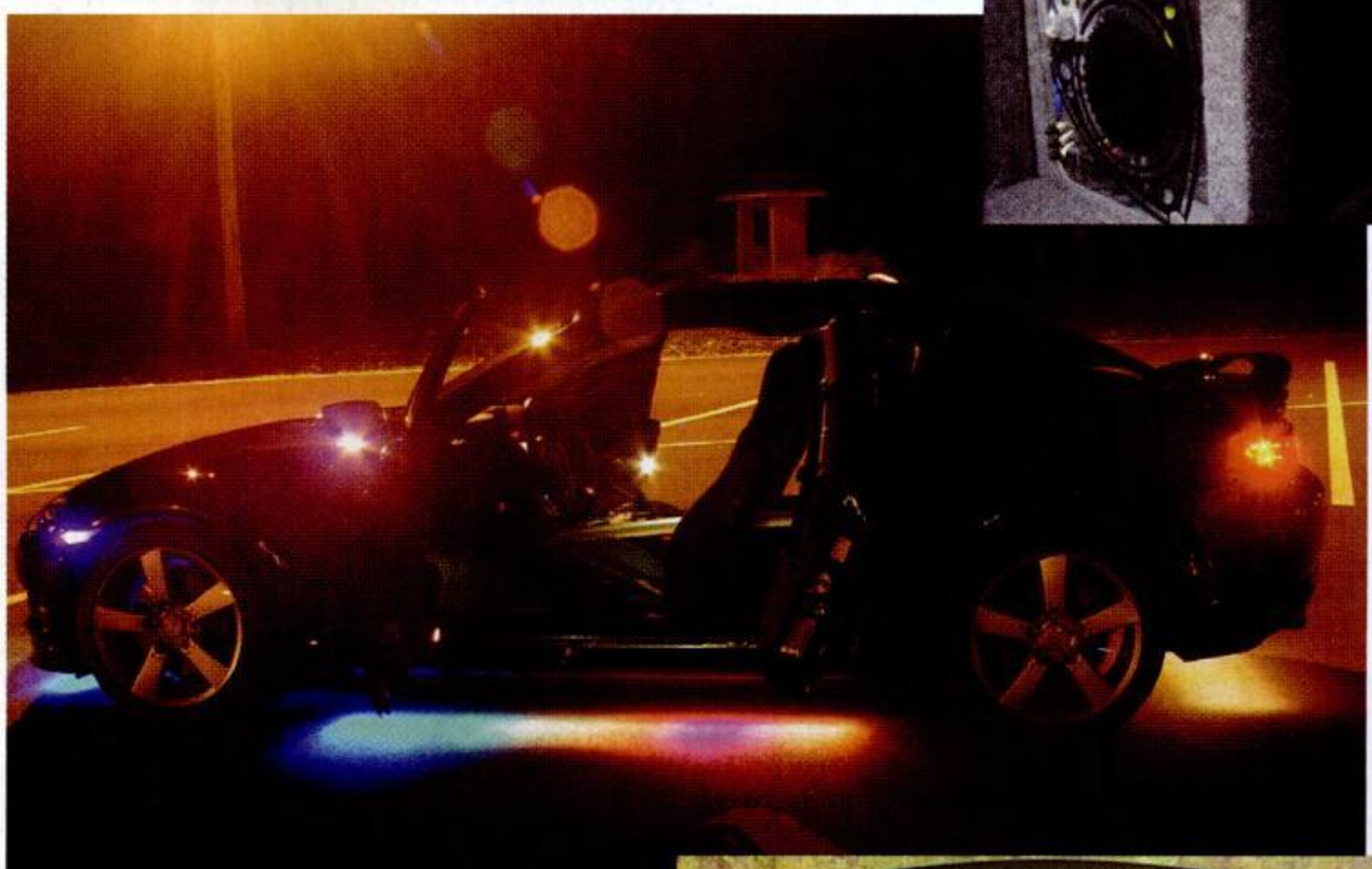
What do you get when you cross a full-ATX PC with a Mazda RX-8 sports car? A party on wheels, apparently, because this tricked-out "rig," spares no form of mobile entertainment.

Chris Cardinale, a gear head in every sense of the word, pimped his ride to serve up music, movies, and games, in addition to traditional PC functionality. Heck, the car's even wired to be a travelling light show.

Of course, when driving, Cardinale only avails himself of the RX-8's 5.1 audio and engine performance-monitoring functions. For that, he needn't even lift a finger, thanks to an integrated voice controller (which augments a touchpad built-into the center console and a backlit keyboard that's stored beneath the front passenger seat). See details at **http://rx8.mine.nu**.

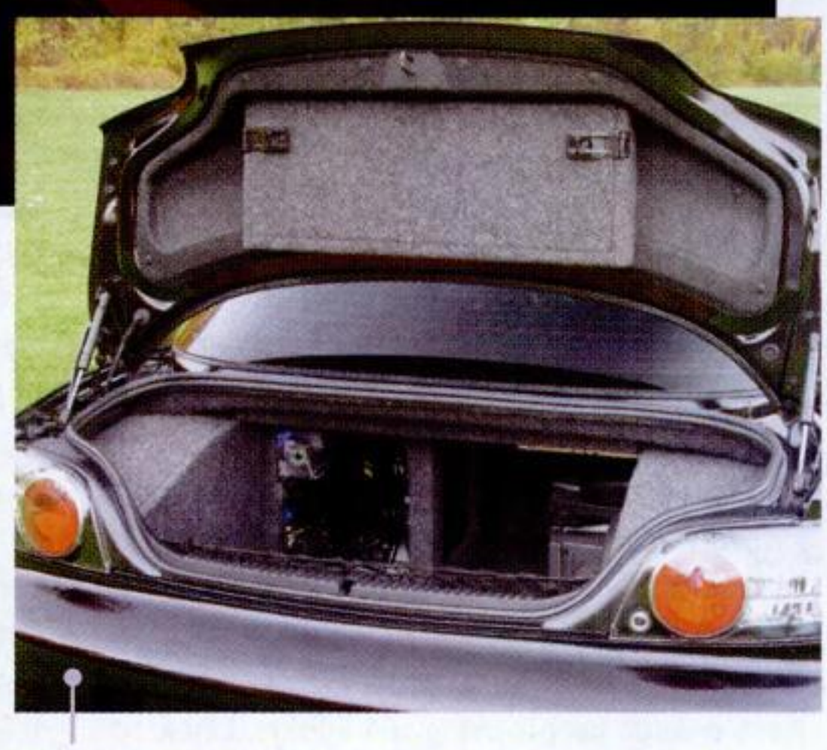
The PC was built into a framework that fits snugly in the RX-8's trunk. Wires run through the car's center console, the side sills, and the rear pillars.

Clearly, a passenger's options are plentiful, with a choice of screens and controllers, as well as integrated wireless headphones, so as not to disturb the driver. "Shotgun!"



Cardinale uses the integrated webcam to record "spirited drives along a nice stretch of road..." or, he jokes, "the occasional police harassment."

This is what a tailgater might see. Video sources in the system include a DVD/CD player, a DVD/CD changer, TV, PS2, computer via an RGB-to-composite (RCA) video adapter, and two auxiliary inputs.



"I knew there might be a potential for heat-related issues," says Cardinale, "so I decided to go with a P4 for its well-known thermal protection. I have never feared packing the trunk full... and have done so on many occasions."

SPECS

MOBO	Asus P4R800-V Deluxe
CPU	Intel P4 2.8GHz
RAM	512MB Corsair DDR400
HARD DRIVE	WD 200GB 7200rpm
OPTICAL	Samsung CD-RW/DVD

If you have a contender for Rig of the Month, e-mail **rig@maximumpc.com** with high-res digital pics and a 300-word write-up.

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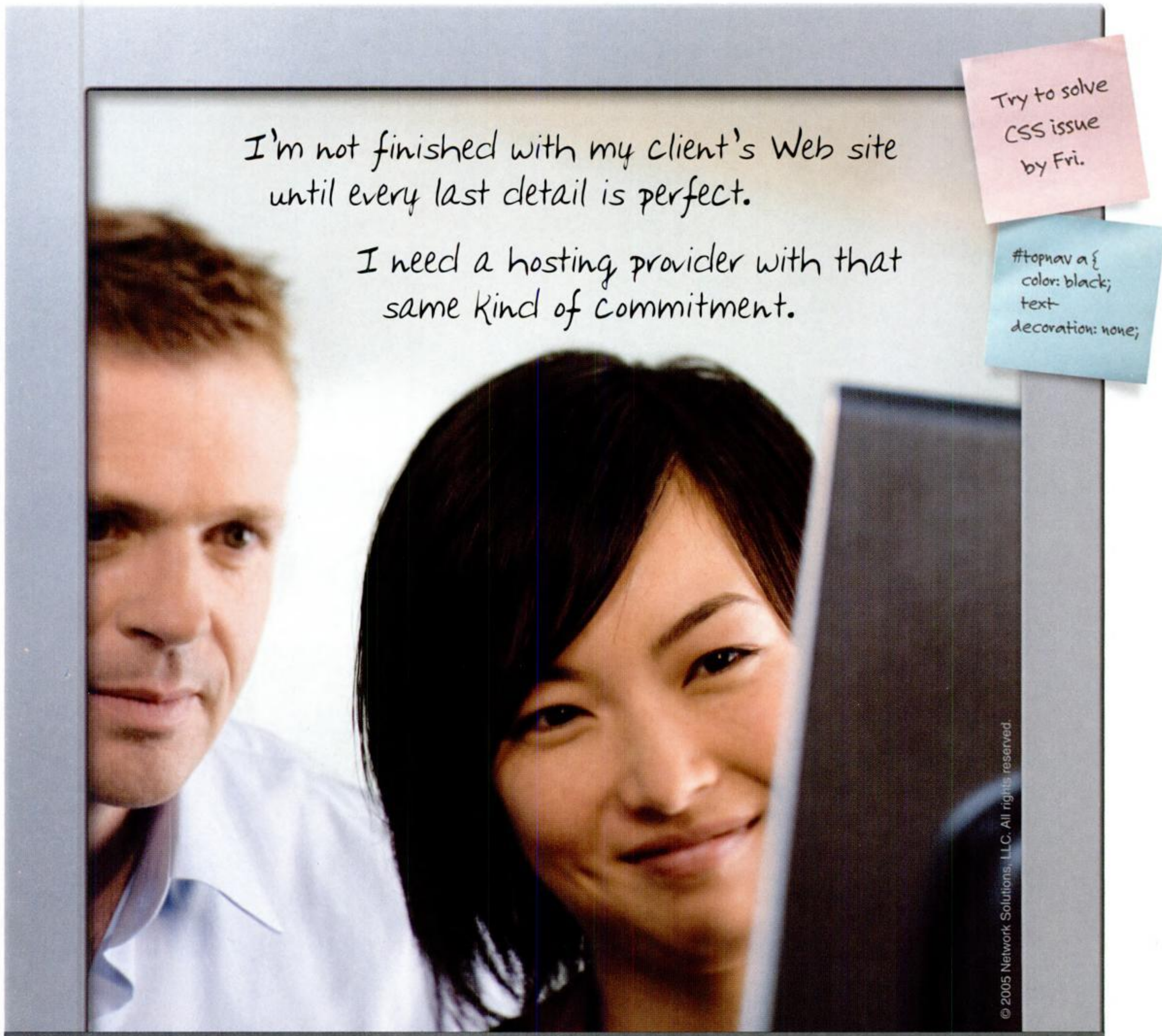
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I need a hosting provider with that same kind of commitment.
Try to solve CSS issue by Fri.
#topnav a {
color: black;
text-
decoration: none;
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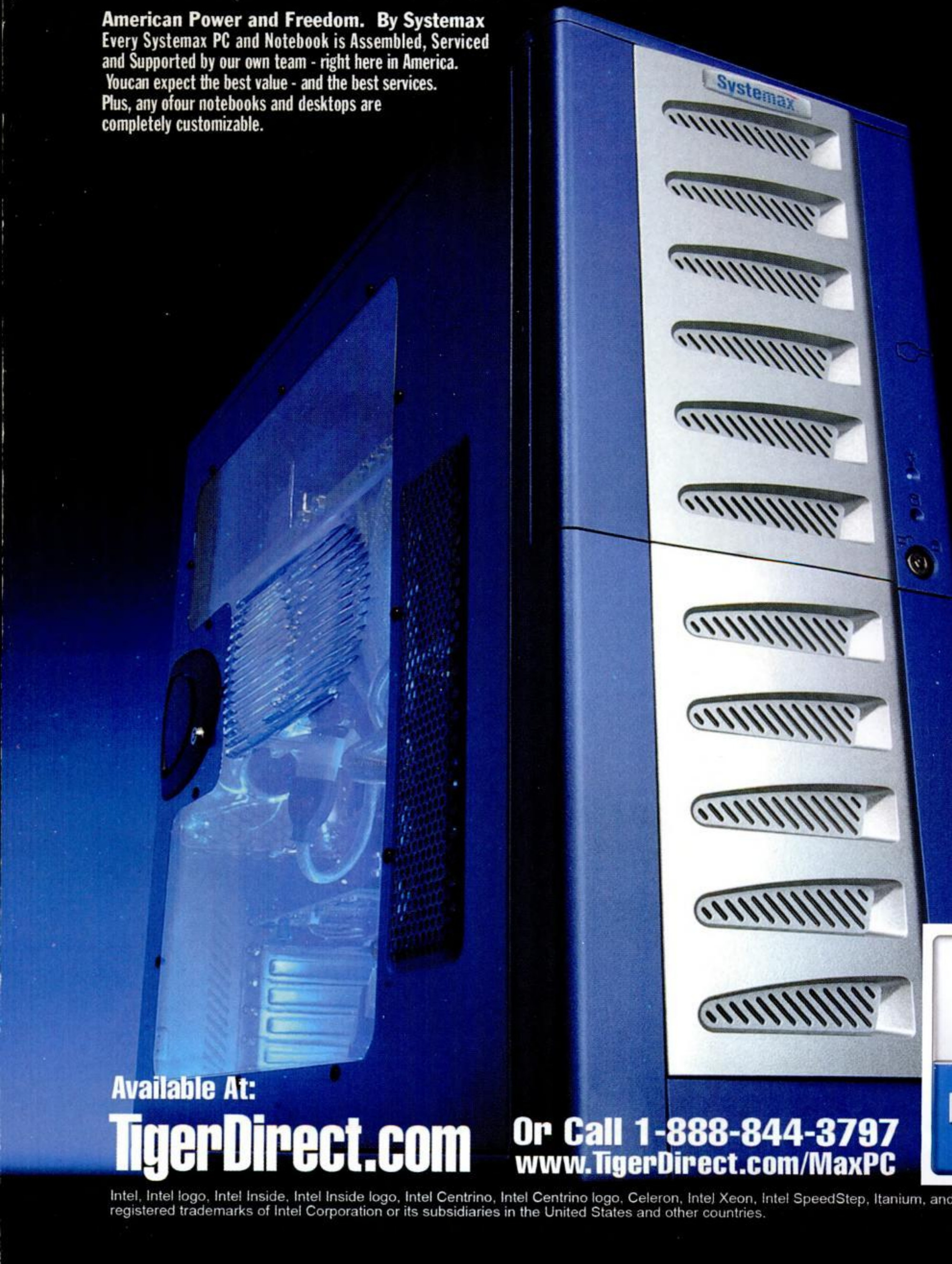

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